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REFLECTIONS ON IMAGING — ONE INSURER'S NICHE KNACK

AN ISG COMMUNICATIONS PUBLICATION

SmithKline Beecham Animal Health's Annette Ho



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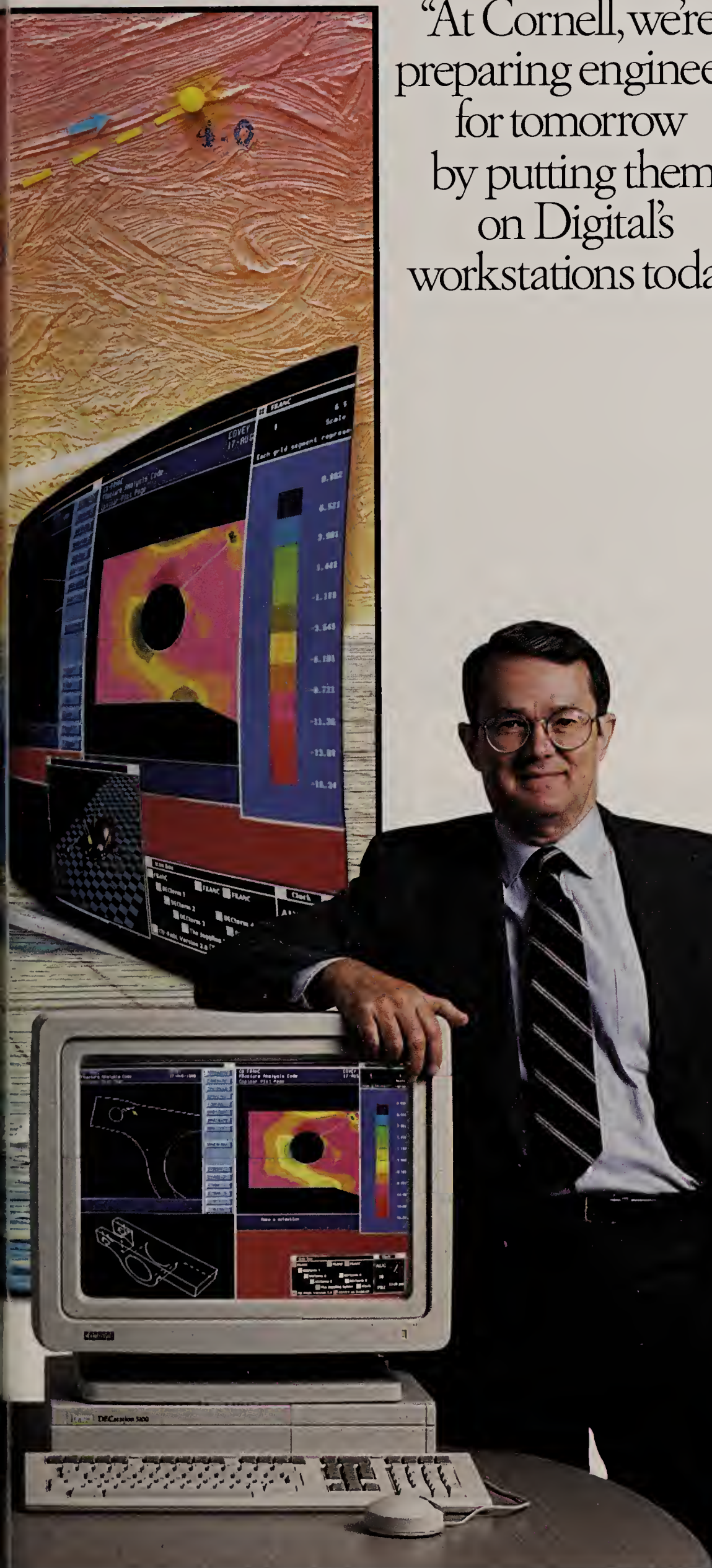
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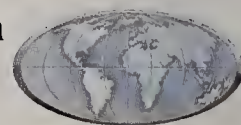
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COVER STORY

The Image Process

The benefits of installing an image system go beyond replacing file cabinets to redesigning the flow of work itself.

By Paul Konstadt

32

FEATURES

There's No Such Thing as a Bad Risk . . .

. . . Only a bad rate. Cleveland's Progressive Corp. uses IT to help it make the most of its high-risk niche.

By B.G. Yovovich

20

Everything You Know Is Wrong

Consultant Bruce Rogow sees the seeds of potential disaster taking root in some of what passes for conventional IS-management wisdom these days.

By Kathleen Melymuka

52

Becoming More Friendly

The user-computer interface needs improvement—not glitz, bells and whistles, but ease of use in the broadest sense.

By B.G. Yovovich

64

DEPARTMENTS

Human Factors 8
Learning to consult

Trendlines 12
► Logistics consulting
► Consumer clout
► IS priorities survey
► Businessland repositions
► Elvis, it's for you
► Career moves
► Phone felons
► CIM overseas
► Oops . . .

State of the Art 72
E-mail branches out

Events/Index 77

Conference Call 79
Can vendors be partners?

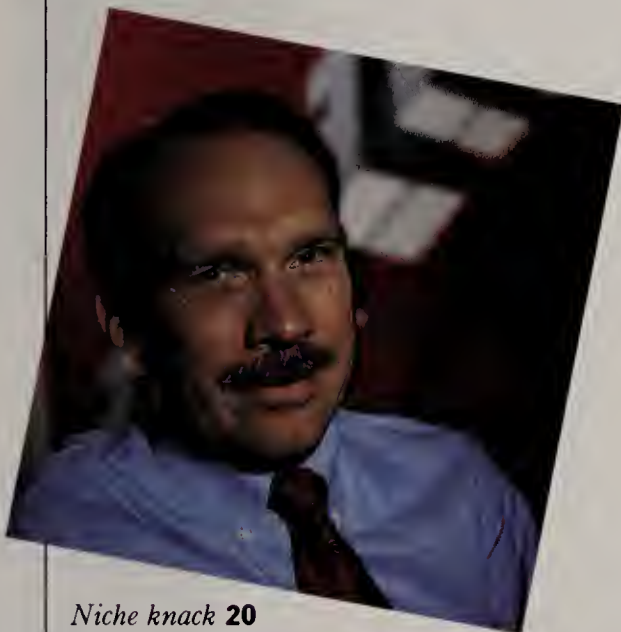
Getting there
from here 12

Team play 8

A pleasing image 32



Cover photo of Annette Hawk
by Eugene Mopsik



Niche knack 20



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A couple of years ago, information technology invaded the consciousness of management because it was the vehicle to deliver competitive advantage. Just about every publication, from the trades to mainline business magazines and newspapers, broadcast the competitive advantage battle cry. Every CEO, COO and CIO yearned for the system that would catapult his or her company into the top industry spot.

Great debates ensued. A lot of heat was generated about the types



of industries and applications that were ripe for cashing in on competitive advantage. Discussions of these matters invariably enlisted the four-quadrant box diagram popularized by leading business school gurus. CIOs dreamed that their companies were positioned in the upper-right quadrant—high/high land, a place where the opportunity and ability to develop competitive systems were highest. But while competitive advantage may have captivated the consciousness of industry and the press,

the actual systems have been a lot harder to deliver. Iconoclastic IT observer Bruce Rogow, featured in our article "Say It Ain't So . . . OK, It Ain't So," on Page 52, posits that today competitive systems are often necessary just to stay in business, and staying in business often means changing the way business is done.

Since the inception of *CIO* two and a half years ago, our articles consistently have addressed the fact that new technology changes the way organizations operate—in their dealings with other organizations and in their own internal procedures. Our cover story on image processing this month is no exception (see Page 32). The article focuses on the experiences of "veteran" users of the technology. During his interviews, Senior Writer Paul Konstadt was impressed with the emphasis executives placed on the way imaging systems altered business operations.

In the past, executives may have placed too much emphasis on the results of individual systems. Now it appears they are beginning to shift priorities, increasingly realizing they can use IT to direct the underlying infrastructure of their companies.

A dramatic manifestation of this new corporate mind set surfaced in the Index Group's annual survey of top concerns of IS executives for 1990. "Reshaping business processes through IT" is the number-one issue for CIOs, up from 11th place last year. And last year's first-place priority—achieving competitive advantage—slipped to number eight (see "Trendlines," Page 12). This realignment augurs well for the continuing evolution of IT into the societal mainstream.

Marcia Blumenthal



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Learning To Consult

As users' needs and expectations change, IS professionals must master new interpersonal skills and become collaborators rather than prescribers

BY LYNDIA C McDERMOTT

It's an unfortunate scenario. The CIO has received a number of complaints from user groups in the company about one of his top IS staff members. Even after several discussions with the employee, the complaints continue: Although he is one of the most technically competent managers in the IS group, the employee is uncooperative. He delays projects because of technicalities, tries to take projects in different directions from what the users want, and dumps unscheduled work on users' staff.

Sound familiar? Unfortunately, many IS professionals are technically proficient but lacking in human-relations savvy. They are articulate, bright and respected for their functional expertise. Their biggest problem, and one that will get in the way of their receiving further recognition and rewards if it's not resolved, is how they relate to their internal clients.

Results of client service surveys our organization has conducted for IS departments indicate that internal clients are increasingly complaining

about and demanding more from IS staff in terms of the underlying relationship or social aspects of their interactions. For example, one recent group of survey respondents described what they wanted (and didn't want) from IS:

- IS should be proactive, not simply reactive, in its support of internal clients.

- CIOs should continue to be strategic thinkers, but at the same time they should be prepared to help users with nonstrategic operational problems.

- Too many IS executives evince the attitude that the company's internal users are captive clients and that they have to take what is given to them.

- Some IS departments seem to be prone to giving users all the reasons why they can't have what they want; why can't IS be more flexible?

- Even users who finally have good systems complain that there was a lot of conflict and unnecessary energy squandered in getting there.

- IS staff need to do a better job of marketing themselves to manage-





March 1990

"Information is the key resource in business today. Use it strategically and profit. Ignore it and fail."

Professor Charles Wiseman,
Columbia University
Graduate School of Business

Dear Executive:

The information age is now in full swing, and the pace of both business and technological change continues unabated. The question is, how do you create systems today that will help cope with the marketplace of tomorrow?

The challenge for all of us is to recognize trends and discern future directions, and then to think about ways to benefit from the possibilities we foresee. Conventional wisdom in the industry has said that hardware -- more hardware, different hardware, the latest hardware -- could address just about any business problem.

That is no longer the case. Today we are challenged to keep pace in other fields of information management. There are three areas in which technological innovation has lagged: software, networking and the interoperability of computers.

CIO Magazine and AMR International are teaming up to present our second CIO EXECUTIVE FORUM to help you explore the real business issues for the '90s. For detailed information on our upcoming conference, "Computer & Communications Strategies & Global Competition," to be held May 20-22 in Dallas, please call Lori Cardarelli (508) 935-4631, or Diane Martin (508) 935-4274. They'll rush you complete information plus a registration package via return mail.

Sincerely,

Joseph L. Levy
President and Publisher

P.S. - Enclosed with your March issue you'll find an IDC White Paper entitled "Unix, Opening the Door to Business Solutions," sponsored by Data General Corporation. I trust you will find it interesting and informative.

Coming in CIO

Disaster Relief

The October earthquake in San Francisco showed the value of having a disaster-recovery plan in place—even when the data center is far from the epicenter. *CIO* examines disaster-recovery options and strategies.

Outsourcing

Although we stop short of calling it the rage, letting third parties take on the burden—and worry—of a variety of information-processing chores is clearly an idea that is spreading. *CIO* looks at whether outsourcing is a blessing or merely a contagion.

An Ounce of Information Technology . . .

. . . Is worth a pound of competitive advantage? If only it were that simple to weigh the bottom-line contributions of IT. *CIO* takes the measure of the complicated business of valuing technology.

What's New in CASE

Enough to write about. IBM has blessed the technology by announcing a product. There is growing emphasis on CASE methodologies and integration of CASE tools. If your organization hasn't adopted CASE, but is thinking of doing so, what should you do to get ready for it?

ment and to user departments.

Sadly, the profile of many IS professionals does not lend itself to effective working relationships. Research indicates they have a high need for autonomy and control over their work. On assessment surveys they received very high group composite scores for skills in the technical and tactical categories and low scores for working with people, functioning as part of a team and cooperation. They are achievement-oriented and ambitious—often with strong egos. While many of these characteristics are valuable assets, they can also lead to interpersonal competition and cause the IS professional to be impatient and inflexible with others, and to operate from a “need to be right” position.

For years, in the interest of providing the best technological solutions and preserving the integrity and security of the systems environment (particularly a centralized one), IS staff could get away with being controlling technical prima donnas. Technologically unsophisticated users had limited involvement in project management and requirement specifications. Today, however, users are more capable of challenging IS solutions and schedules. As they become more technically literate, they are demanding more involvement in the process. The highly individualistic and controlling approach does not work in a more decentralized, user-driven IS environment where partnership, teamwork and consensus management are now required.

While it might be tempting to bury problem employees in the back office, the increasing levels of IS-end user interaction make the back office a shrinking sanctuary. Very few members of a typical IS group can be necessarily productive without some degree of client contact. And in these days of shrinking head counts and competition for competent personnel, the CIO cannot afford to bury anyone. Employees' expertise will not be fully utilized, nor will they receive the recognition they want, unless they can learn to use their capa-

bilities constructively by influencing others and working for mutually beneficial solutions.

Can such workers learn to become better business partners with their internal clients? Yes. But experience

Many IS professionals are technically proficient but lacking in human-relations savvy. Their biggest problem—which, if not resolved, will get in the way of their receiving recognition and rewards—is how they relate to their internal clients.

suggests that it will not happen without some effort and change in attitude on their part—and perhaps on the part of the CIO as their boss. Here are some key pointers that the CIO can use to coach his or her IS professionals toward more successful client-service relationships:

■ IS staff should be encouraged to examine their underlying assumptions about their roles as service professionals. Are they individual expert contributors or relationship managers? Many IS professionals assume that what they are being paid to provide the organization with is just “brain power” and technological solutions. They neglect to remember that the IS job is to support and serve the departments and users in the organization.

As one senior vice president of IS, whose department has been “unbun-

dled” from the parent corporation and set up as a subsidiary, now realizes: If the cost and client service are not satisfactory, his once-captive users are apt to shop in the external marketplace. Therefore, he must begin to hold all of his people accountable for serving their clients.

■ Employees need to initiate positive interaction. Client service and effective working relationships involve mutual effort. However, many internal clients are still technologically “gun-shy” and welcome the IS professional who appears on their doorstep anxious to help with productivity or qualitative solutions. One IS group has given its staff members business-unit liaison assignments. IS staff now regularly attend their internal clients' meetings (and social events) in order to maintain continuous communications and harmonious relationships.

■ IS staff members should be encouraged to obtain feedback on their interpersonal/social style and to analyze how well it fits in with various clients. A variety of assessment instruments can provide information about what style they tend to use when relating with others in both normal and stressful interactions. For example, are employees more “assertive/directing” or “analytic/autonomous”? In isolation, an individual's particular style is neither right nor wrong; however, it may become problematic when that individual tries to relate to people with very different styles. IS professionals who are aware of their own interpersonal/social styles and pay close attention to the styles of their clients will be able to adjust their behavior to ensure more effective working relationships.

■ Staff should be instructed to avoid “win-lose” posturing and to look for “win-win” solutions. There is often a power struggle bubbling beneath the surface of many disagreements between internal clients and IS staff. Each group assumes an all-or-nothing stance. When they find themselves in these Mexican standoffs, employees should force themselves to look first for areas of agreement. Instead of refusing to negotiate, they

should look for a third alternative, or compromise position, that everyone will be satisfied with. For effective problem-solving, IS staff must move off a position of needing to be right all the time. They should practice active listening—that is, working to really hear what the clients are saying or asking for—in order to understand the pressures and issues their clients are facing.

■ IS personnel must learn to do whatever it takes to get the job done. When users and IS staff negotiate agreements, they often walk away with neither side being fully committed to really making the project work. The result is that one side or the other (or both) ends up resisting the solution, either actively or passively, or withholding the necessary effort. In numerous case studies, it has been found that there was often no real agreement to the proposed actions—that both parties assumed that such proposals would simply be allowed to drop through the cracks. Therefore, when working through issues with their clients, IS staff need to clarify and verify the exact nature of their agreements and to test how committed both they and their clients are to the goals and actions they've agreed to. Follow-through, with no delays or uncommunicated surprises, should then provide mutually beneficial results.

■ IS staff must learn to sell benefits, not features. Like professional salespeople, the IS group needs to remind themselves that they are providing products and services to a marketplace—even though it's an internal one. The most successful salespeople are those who understand not only what their customers' requirements are, but also what needs the products or services will fulfill—for example, do they save time, make work easier, facilitate meeting productivity and profitability goals? One particular IS group now critiques its presentations to line management, making sure that they are focused on the benefits of proposed technology to the business, not on the whats and hows of the

technological process. This type of strategy is designed to reinforce that IS is there to serve and meet the needs of the business—not the interests of IS.

Even users who express satisfaction with the systems IS develops for them complain that there was a lot of conflict and unnecessary energy squandered in getting there.

■ Another lesson for IS staff is that they need to give up control to gain control. In order to gain control (or exert personal influence), they need to develop trust and mutual respect with their internal clients. It's important that they demonstrate flexibility and the willingness to let their internal clients fully participate in discussions and decisions. As IS staff begin to loosen the reins and allow their clients to contribute ideas, they will likely find less resistance and more acceptance for their own recommendations. In this climate of mutual trust, IS staff will increase their ability to influence and lead.

Dealing with clients is not like solitary work with equipment and applications. It involves a tremendous amount of social and emotional labor. However, the job of the IS professional—particularly someone who wants positions of increasing influence and recognition—is to master the marriage of technology and people management.

For example, Dana, a creative and articulate telecommunications specialist at one of our client companies, has used several of these strategies

and made significant progress in improving her relationships with both her internal clients and her peers in the department. Previously, she had been causing problems for herself and the IS department on a number of fronts. She would continually tell her internal clients that what they wanted was unreasonable; she wouldn't let her staff directly interact with or make commitments to the clients without her approval; and she would deprecate other members of the IS department to her favorite clients and engage in turf wars with her peers.

After many discussions with her boss and meetings with peers and clients, we suggested that she attend an external program to learn more about her interpersonal style and relationship habits, with the hope that this feedback would help her to improve her working relationships in the organization. Within one month after Dana returned, significant and consistent changes were evident in her behavior.

When asked what she had learned and was now applying on the job, Dana replied: "I learned about how I typically react to different situations and how to pay attention and analyze how others react. Learning and knowing this about my peers and clients helps me to predict and adapt to their different styles. I wasn't really happy with what was going on in my relationships with others, but I really didn't know what to do about it and found it easier to blame others. I now realize that they're not and I'm not to blame in a conflict situation—it takes two to cause a conflict; however, I realized that I need to take the lead in adjusting my style to the other individual and to really listen and work toward compromise solutions. It's amazing—I hardly ever get into battles anymore—and when I do, at least I can stop myself sooner!" ☐

Lynda C. McDermott is president of EquiProp International Ltd., a strategic-management and organization-development firm headquartered in New York.

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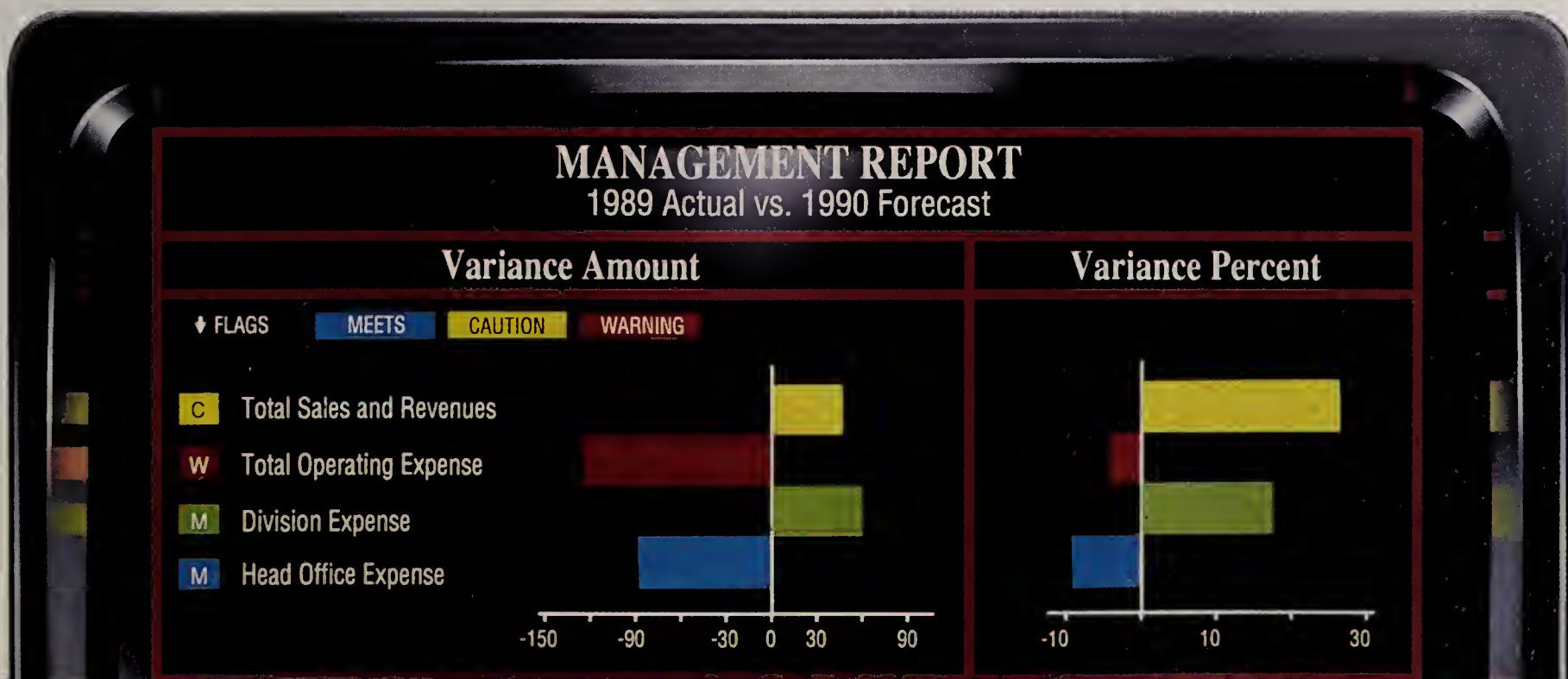
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* "Decision Support and Executive Information Systems: Markets and Trends," International Data Corporation, November 1988.



TRENDLINES

DATA FLOW

CORPORATE CHOREOGRAPHY

Many businesspeople no doubt recall that logistics used to be a purely military science. But business is fond of adopting military terms to describe its growing concern with strategic planning and outmaneuvering the "enemy." Hence, the term logistics management now applies to the movement and positioning of civilian fac-

Peter Fuchs, a managing partner in the Strategic Services practice at Andersen Consulting in New York.

Andersen recently announced the expansion of its international logistics consulting practice, which handles customer service, distribution-channel selection and design, warehousing strategy, transportation strategy, materials management, and organization and change management, in addition to systems integration.

Not to be confused with outsourcing, logistics management as it applies to IS has to do with the economic issues surrounding the movement of information throughout the corporation. It deals with streamlining the organization's information network, rather than the day-to-day handling of information.

Today's merger mania and the trend toward downsizing among large corporations have left many businesses with redundant systems and inefficient network designs. Fuchs gave the example of the European Economic Community of 1992 as an arena in which it will be

particularly important for companies to review and revamp their methods of moving goods and information. The elimination of economic boundaries could allow a single mainframe, for instance, to handle information from several countries that once required a separate installation in each country. By cutting out redundant systems, logistics managers save businesses time and money and reduce the risk of mistakes.

In expanding its logistics

practice, Andersen is merely attempting to keep pace with its clients and the considerable investment they have tied up in information systems. "Logistics [is] a very important part of an organization's business strategies and the execution of those strategies," Fuchs said.

Another reason for the added emphasis on the logistics of information, according to Fuchs, is that his customers'

customers are becoming more demanding. "As you get down toward the end of the pipeline . . . people are less willing to hold inventory and are less tolerant of missed delivery dates. If the materials [and information] you need . . . are not there, you're potentially shut down. The need to increase your levels of customer service without increasing your costs becomes a critical competitive issue."

ON THE RECORD

Back in the bad old 1960s, when Ma Bell was a much-hated symbol of the bad old "establishment," a group of early hackers, known as Phone Phreaks (or was it Fone Freaks?), committed enthusiastic acts of phone-booth sabotage and thievery in the name of the Revolution. According to a recent article in the *New York Times*, the heirs to this tradition have mutated into hardened criminals and are ripping off corporate switchboards for long-distance calls at the rate of hundreds of millions of dollars a year.

These long-distance larcenies are made possible, according to the *Times*, by the vulnerability of switchboard access codes, which hackers can detect using trial-and-error software routines executed by calling in to toll-free lines. The article, by business reporter Calvin Sims, tells the story of a chief executive who, while working late one night, discovered that all of his company's lines were busy—which was odd, since he was the only one there. His director of operations looked into the problem and discovered, as quoted by Sims, that "there wasn't a single line available in our entire switch of over 50 telephone lines. [They] were all occupied by people speaking other languages." In the eyes of its long-distance carrier, MCI, the company turns out to be on the hook for every cent of the \$50,000 in charges rung up by the thieves.

The article advised that companies make their access codes longer, thus complicating the problem of discovering them; cancel the codes of employees once they leave the company; train personnel to recognize the signs of rip-off schemes; block all calls to countries in which the company has no dealings; and monitor calling on a daily basis.

With, as the *Times* piece put it, "young men . . . selling switchboard codes for \$7 each" in New York's Port Authority Bus Terminal, the telecom manager's vision of hell is at hand.

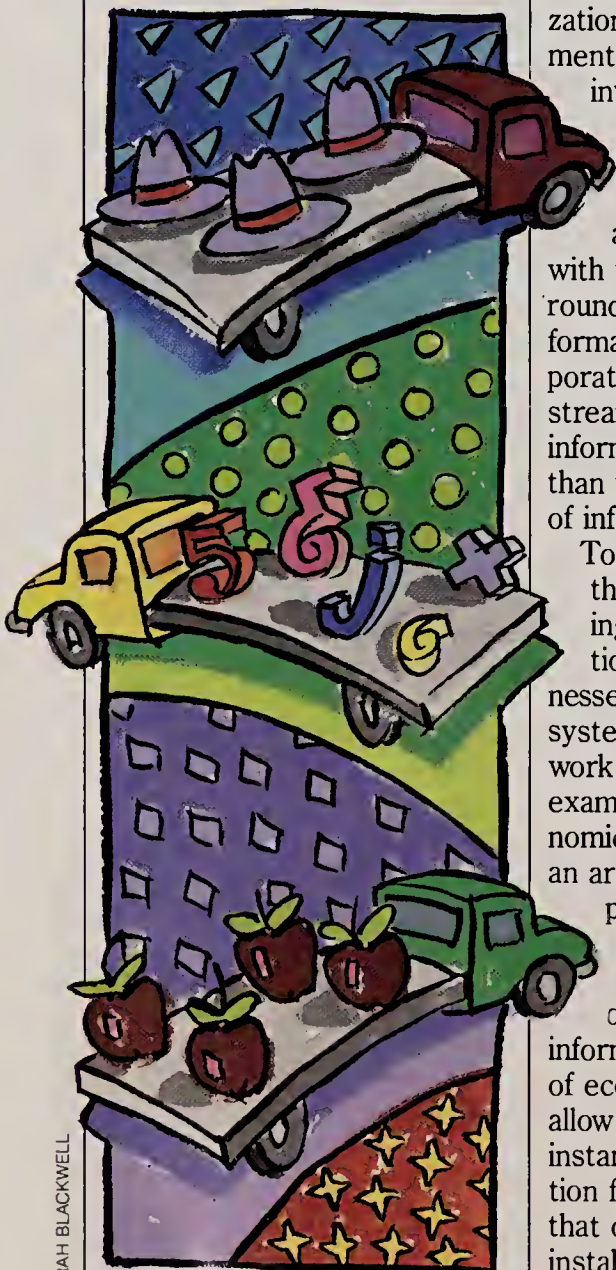


ILLUSTRATION BY DEBORAH BLACKWELL

tories, trucks, people and raw goods. It also applies, increasingly, to information systems and the delivery of information to the customer, according to

ILLUSTRATION BY CHRIS GALL

TRENDLINES

PRIORITIES

UPHEAVAL AS USUAL

Information executives apparently see 1990 as the year to use technology to redesign organizational procedures. That goal tops the list of 20 critical issues outlined in a recent survey of 335 U.S., Canadian and European CIOs by the Index Group, a technology consulting firm based in Cambridge, Mass. The top 10 issues demonstrate some surprising changes from last year's survey (see chart).

So, what—besides reshaping the organization—is on the minds of IS executives? Some 82 percent of U.S. CIOs are confident there will

be a central IS function in their organizations by the year 2000, and 86 percent believe their jobs will be challenging and rewarding during the 1990s. Despite this optimism, CIOs projected that their IS budgets would grow on the average of only 6.9 percent this year, down from the 7.5 percent growth projected last year.

CIOs are apparently not dazzled by the lure of the leading edge: Only 38 percent of the U.S. executives said it was important to explore and rapidly implement technological advances. CIOs are avidly interested in CASE, transparent interfaces to host computers, computer security products and network management.

From an organizational perspective, 65 percent of CIOs polled said it is now easier to align IS and corporate goals; 62 percent regard IS as pivot-

al in using IT for competitive advantage. (This apparent progress may explain the lower priority given to the alignment question this year versus last year.) Paradoxically, few U.S. CIOs said their firms had a formal process for using IT to contribute to business performance.

A little more than half of the IS executives polled in the U.S. said they had no plans to restructure MIS this year. On the other hand, 34 percent indicated they were considering one or more types of fundamental change: pushing application development into the business units; consolidating data centers and IS operations; and organizing IS around business functions rather than around technology specialties.

CIOs reported that more application development is being done in business units and departments, and predict that

end users, who now account for 12 percent of development activity, will build more than one-third of all corporate systems by 1995.

Considering its relatively brief flutter in the strategic spotlight, outsourcing seems to have generated a lot of interest. Depending on their perspectives, readers will either be reassured or frightened to learn that 23 percent of the Index Group survey's respondents are considering outsourcing IS to third-party vendors.

FEEDBACK

European manufacturers are integrating their human, factory and information resources in preparation for 1992, and in the process are becoming much more competitive—so say American CIM managers and experts who recently visited seven European manufacturers.

These managers did not find that European manufacturing technology was more advanced than American technology. "I don't think I saw anything there that horrified me in terms of us being behind Europe," said James G. Nell, a Columbia, Md.-based manager of information technology programs for Westinghouse. But Nell and others were impressed by how European firms were tackling CIM's thorny organizational issues.

"Nearly all of the companies [we visited] were going through some major reorganization," said George P. Andrews, a Warren, Mich.-based senior project engineer for CIM at General Motors. In general, Andrews

found "a renewed emphasis on organizational design, development of leadership skills, employee involvement at all levels, and decentralization . . . to better serve local markets.

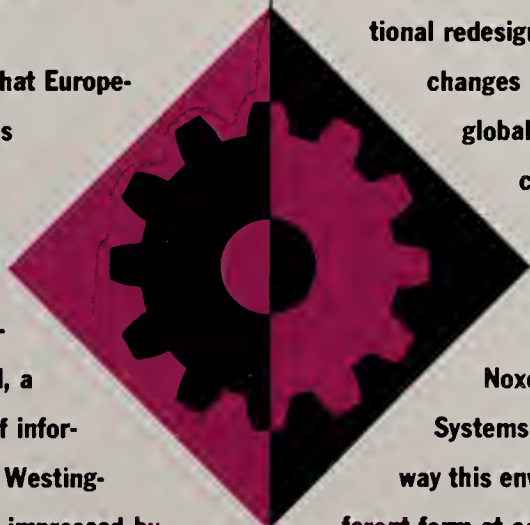
"The advancement of IT has made this organizational redesign possible," he continued. "These changes will make European firms tougher global competitors. I just hope this country isn't totally blindsided."

But while European firms "expressed a need for an integrated environment," said Woody

Noxon, director of the Engineering

Systems Division at Eastman Kodak, the way this environment was designed took a different form at each company, according to its own corporate structure and culture—just as in the United States.

The trip was organized by Computer Aided Manufacturing International Inc. of Arlington, Texas, a non-profit consortium of manufacturing companies that focuses on manufacturing and business problems.



Top 10 Issues for IS Executives, 1990

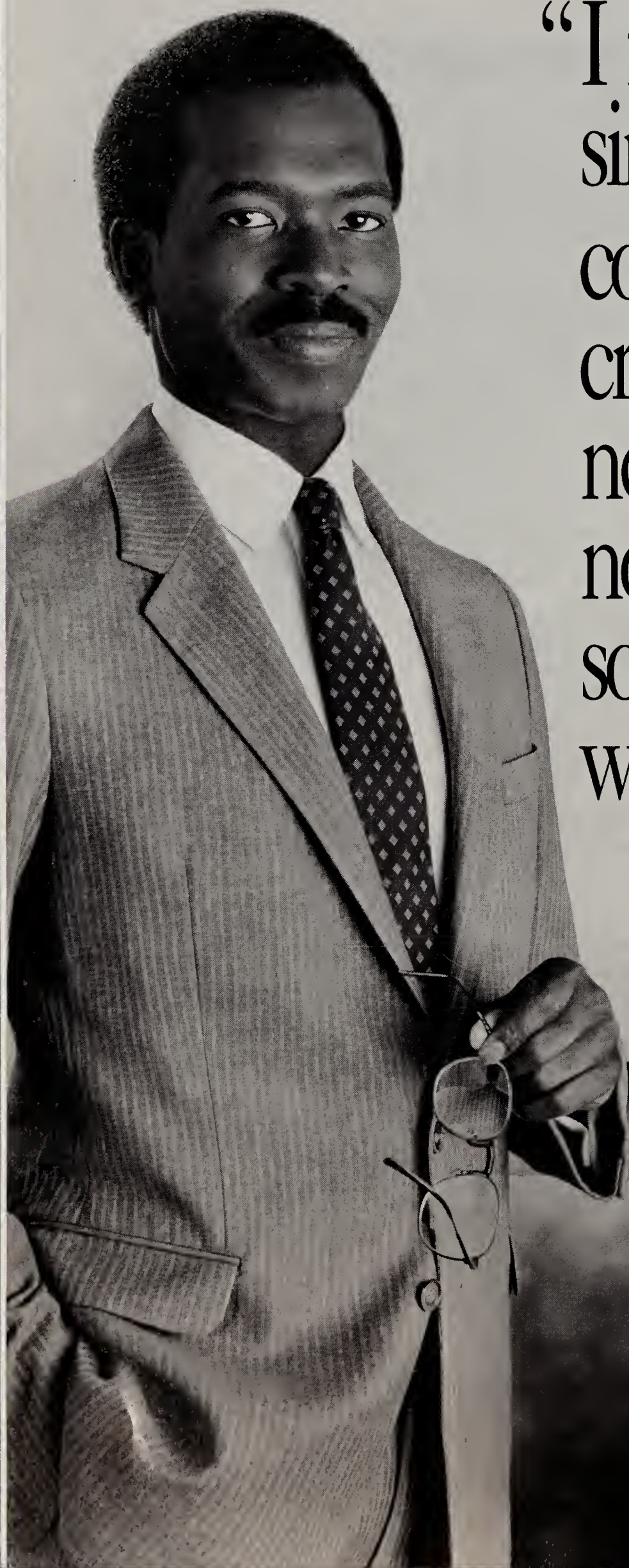
The most important issues for top U.S. IS executives. Ranking in 1989, 1988 surveys in parentheses, out of a list of 20 items. NR indicates issue not ranked.

- 1 Reshaping Business Processes Through IT** (11,NR)
- 2 Educating Senior Management on IS** (3,3)
- 3 Instituting Cross-Functional Information Systems** (7,NR)
- 4 Aligning IS and Corporate Goals** (2,1)
- 5 IS Strategic Planning** (4,2)
- 6 Boosting Software Development Productivity** (13,12)
- 7 Utilizing Data** (6,7)
- 8 Using IS for Competitive Breakthroughs** (1,4)
- 9 Developing an Information Architecture** (5,5)
- 10 Tie: Cutting IS Costs** (14,17)
Improving the IS Human Resource (8,8)

SOURCE: INDEX GROUP INC.

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TRENDLINES

REPOSITIONING

FROM STORES TO CHORES

Fleeing from falling profits, Businessland Inc. of San Jose, Calif., has announced plans to reinvent itself as a "value-added integrator" of business computer systems by closing storefronts and selling directly to its largest accounts out of a branch-office network.

The company—which until now was an aggressive price cutter—has moved to limit the bargains it offers customers. "We have put a ceiling on discounts," said Beverly Bird, Businessland's communications manager, "[and] our commission structure has been changed so that the more the discount [our salespeople] offer, the less commission they make."

In addition, the Businessland sales force is being pressured to push harder to generate service and support revenue. "They have got to make 15 percent of their quota in service and support," Bird added. The service offerings include training, tele-

phone hotline support, system engineering, and network planning, design and installation—in short, said Bird, "ways of maximizing the productivity of the products we sell."

Businessland has seen its operating profit margin shrink from more than 5 percent to less than 2 percent over the past year as a result of increasing competition and price-cutting. It also lost its franchise to sell Compaq Corp. personal computers, and admitted that sales of the high-priced NeXT workstation—for

which it has an exclusive sales arrangement—could not make up for that loss of volume.

The shift from retailer to integrator will not mean

wholesale personnel changes because Businessland al-

ready has the talent it needs in house. "We have some very competent people here," Bird said.

Some independent analysts say the conversion from volume seller to service vendor will be hard for Businessland to manage. "It's not a bad strategy, but it would require

a total restructuring, reorganization and rethinking of all Businessland practices and policies," said Seymour Merrin, president of Merrin Information Services Inc. of Palo Alto, Calif. "Otherwise, it would be as easy as pie."

Bird said Businessland is prepared for some rough going in the immediate future, with continued slim profits for at least the current quarter and a customer list in a state of flux. "We may have to walk away from some business . . . but many of our customers have been telling us, 'we have to have partners that provide us service and support.'"

BUSINESSLAND

PURCHASING

CONSUMER CLOUT

CIOs looking for discounts on PBXs, WATS lines, voice-mail systems, private lines and other telecommunications equipment and services can do what savvy consumers do—buy big-ticket items through a buyer's club. All they need to do is join the American Business Network.

ABN operates under a simple principle: In unity there is leverage. ABN negotiates special discount rates with com-

mon carriers and equipment vendors, enticing them with the combined purchasing power of its 65 members. ABN members can purchase or lease equipment and services from such vendors as Northern Telecom, MCI, US Sprint, Rolm, NEC, IBM, Codex, Apple.

Members include Time Warner, American Home Products, Ingersoll-Rand, Toys "R" Us, Midlantic National Bank, Borg Warner, and the First Church of Christ, Scientist. ABN, which is based in Lyndhurst, N.J., is administered by M&SD Network Services Inc., a division of Electronic Data Systems Telecommunications Services.

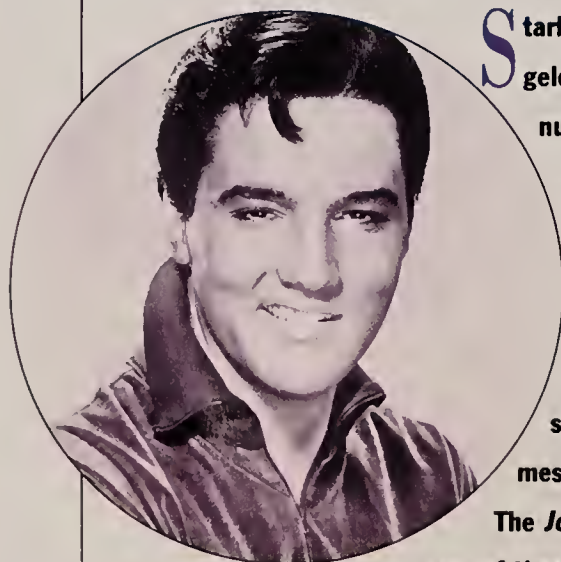
Robert R. Hillebrecht, president of M&SD, declined to elaborate on the size of the discounts. There are too many items offered through ABN, and they vary too much by vendor, to give out an ac-

curate figure, he said. But for companies with large telecommunications costs—say an annual telephone bill in the high six figures—the discounts more than make up for the cost of signing on. According to Hillebrecht, it costs \$55,000 to become a partner and \$25,000 to become a user of ABN's buying service. (Partners, unlike users, can use ABN's design and implementation services and vote on ABN's policies.)

"In most cases, members get the benefits of all the publicly offered tariff discounts," said Hillebrecht. "Our discounts are in addition to them."



ELVIS, CHECK YOUR VOICE MAIL



Starbridge Communications of Los Angeles has set up a 900 telephone number for devotees of the late, but frequently spotted, King of Rock 'n' Roll. According to *The Wall Street Journal*, "the system lets fans who believe Elvis Presley is still alive record personal messages to him."

The *Journal* does not mention whether any of these calls have been returned.

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TRENDLINES

CONFERENCES

SLOGANS ARE OUT, EXECUTION IS IN

Veterans of the IS conference circuit have often used such gatherings to test the prevailing wind for its idea content. *CIO's* well-attended inaugural conference on "Information Strategies and the Bottom Line," held last month in Laguna Niguel, Calif., and co-sponsored by AMR International, contained the no-nonsense message that the trend, as one speaker put it, is away from strategic sloganeering and toward execution and impact.

There was plenty of blunt talk about deliverables and making a competitive difference, and a clear sense that it is now time for IS to pay off on its growing esteem.

Studies of the CIO function abound, and no conference is complete without some fresh stats. Raymond J. Lane, who heads the IS consulting practice at Booz Allen & Hamilton, one of the *CIO-AMR* conference's host organizations, presented some findings from a study of CEOs and CIOs that Booz Allen conducts every three years. One



DUWAYNE PETERSON (top, left) and **HENRY PFENDT** were among the speakers at *CIO's* first conference. Attendees got inspiration at the plenary sessions and networked during breaks.



apparent change from the 1987 study is that the CIO concept has now been accepted and internalized by a large number of chief executives, fully 72 percent of whom say they believe the CIO will be a key player on the scene in the



making—a goal that places high burdens on CIOs as the guarantors of data quality, security and accessibility.

A panel chaired by Lane and taking off from the Booz Allen research findings found itself wrestling with stubborn problems. Joseph Nash, CIO of Cadbury

Schweppes Inc., put the centralize/decentralize dilemma in a nutshell when he asked what level of control over global business units assures "cohesive business processes" while also preserving operational decision-making autonomy. Henry Pfendt, director of corporate IS and IT services at Eastman Kodak Co., called for a re-engineering of the "IS value chain" to emphasize what is truly critical to the goals of the company.

DuWayne Peterson, executive vice president of operations/systems & telecommunications at Merrill Lynch & Co., said that CIO leadership is critical. "You have to become a part of top management so that you are making decisions on the IT investment," he said. Charles Darnell, senior VP and general manager of the electronics and IS group at Lithonia Lighting, echoed Peterson's call for CIO access to the top, saying that an effective partnership between the CIO and CEO produces an "explosion" of opportunity. ■

year 2000. CIOs were themselves less sure of their future: 45 percent of the CIOs polled believe the role will be absorbed into line management by decade's end.

The study also indicated that there is relatively high satisfaction among top management with the performance of corporate systems. Seventy-five percent of CEOs believe systems deliver adequate value, but they are unable to say exactly why—a fact that somewhat clouds this favorable view.

The conference sessions highlighted the pervasive and growing dependence upon systems in companies' day-to-day business processes. Jack Simpson, president of Mead Data Central Inc., another conference host, predicted that the effective integration of internal and external data sources would make possible virtually real-time decision-

CAREER MOVES

Former Unisys CIO **Alan Jones** has moved into a line position with the Blue Bell, Pa., computer vendor. Jones was named vice president, sales, for the Communications Industry Systems Division, one of Unisys's five major commercial divisions. Jones, who had been with Sperry Corp. for 12 years prior to the 1986 merger with Burroughs that created Unisys, will manage sales and service to RBOCs and independent telephone companies.

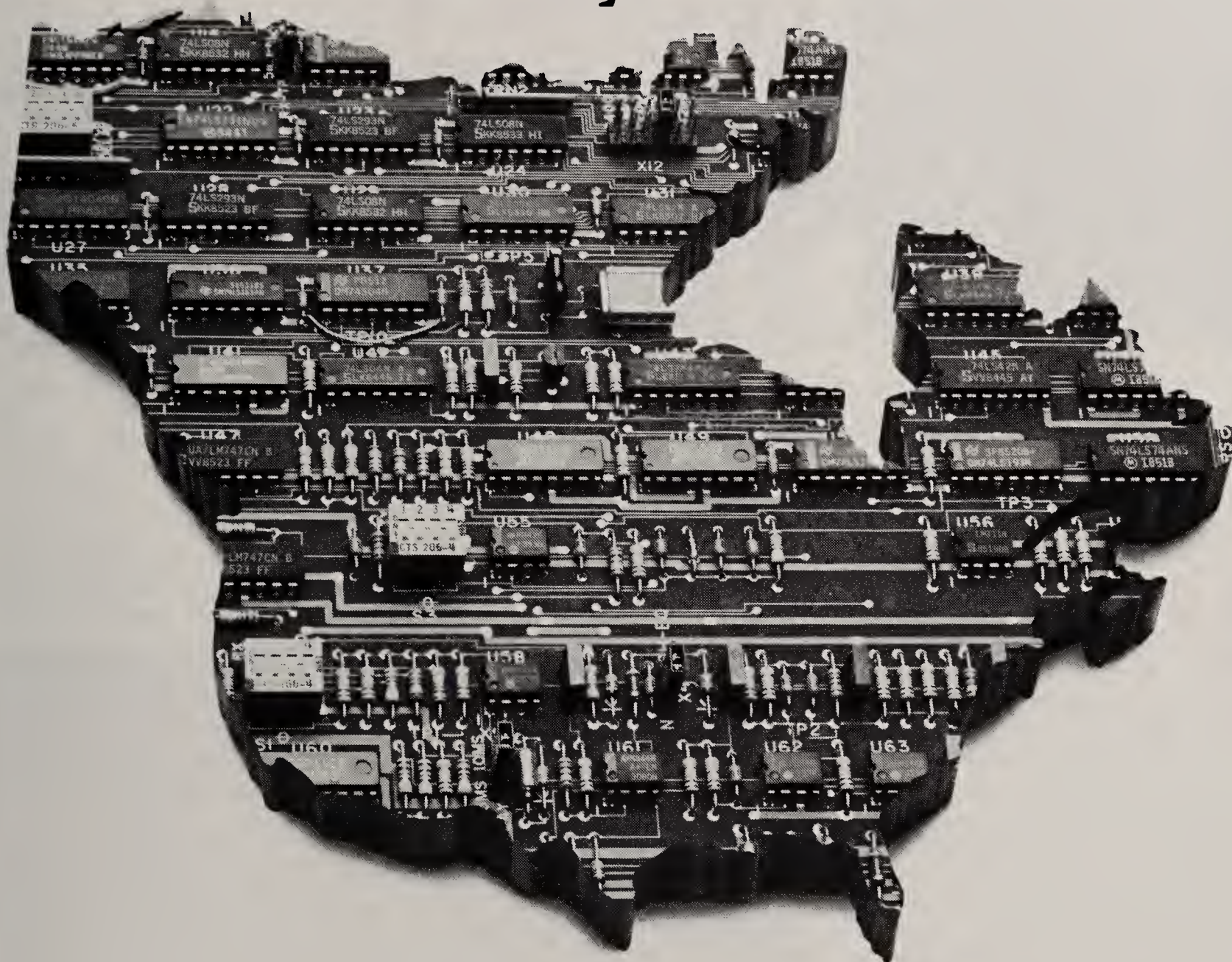
Richard Kish has been promoted to the position of vice president, MIS, for Waldenbooks, the bookstore chain based in Stamford, Conn. Prior to his promotion, Kish was Waldenbooks' senior director for corporate systems. In his new post, Kish will report to CFO Hank Fisher and will be responsible for directing the design and development of distribution, tele-ordering, merchandising and financial systems. ■

CORRECTION

The name of one of the authors of an *Insights* column in the January issue ("The Compleat EIS") was inadvertently omitted.

Robert L. Konrad, a senior executive consultant with the Executive Insights Group, of Bryn Mawr, Pa., should have been given the credit along with **Dudley Cooke**. *CIO* regrets this oversight. ■

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Progressive Corp.'s
use of information

enables it to
take on risks that
other insurers
won't touch

Progressive Corp. leaves no doubt about its attitude regarding the importance of information. The Cleveland-based insurance company's annual report trumpets: "We revere accurate data. We collect, analyze and make data accessible because we know it will unlock opportunities to meet customers' needs and we invest heavily in new information systems."

Progressive's executive vice president and chief operating officer, Bruce Marlow, elaborated: "The information function is not only an essential part of any successful insurance organization, but of any insurance organization that intends to survive, and the role of information systems gets bigger and bigger."

Even outsiders are clear on the company's approach: "Progressive worships at the altar of information," said Gerald Lewinsohn, first vice president and senior specialist for the insurance industry at Merrill Lynch & Co. in New York. Progressive is widely regarded as one of the insurance industry's best-managed firms. "The edge that they have [—and] that puts them in a different class [from their competitors—] is that they have always been careful collectors of information."



Progressive's long-standing reverence for data has emerged directly out of business considerations. Founded in 1937, the company has carved a niche for itself as one of the leading players in the non-standard auto-insurance market—providing coverage for drivers who have been rejected or canceled by other insurers.

"You can write high-risk or low-risk auto insurance," Marlow explained. "A lot of insurance people think that if they get the low-risk segment of the market, they are OK. But that is not enough. The real question is whether you get a fair premium for the exposure."

"There is no bad risk, just a bad rate," added Senior Vice President of IS Rex Wolf. And the effective use of information is crucial to making sure that Progressive gets its rates right.

In fact, the secret to Progressive's growth has been described as a strategy of taking the best of the worst risks, charging the average premium for the worst risks, and making handsome profits as a result.

"One of the keys to their success is segmentation and the use of vast amounts of data to fully understand the risk characteristics of their business," said David Vargo, assistant vice president and insurance-industry analyst with Duff & Phelps Inc., an

BY B.G. YOVOVICH

investment-banking firm in Chicago. "They assume a higher degree of risk in the policies that they are underwriting, but they are compensated for them."

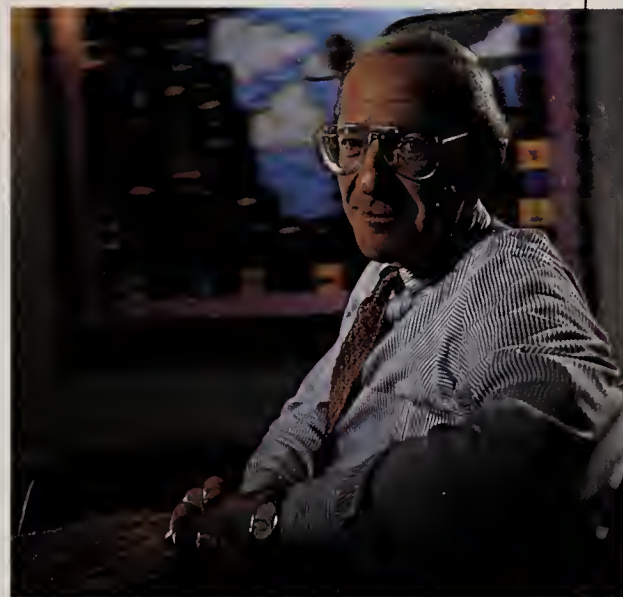
Such a strategy would never be possible without information technology. "Technology is intrinsic to the nature of this business," said Marlow. "Having information about the exposures [and] losses and the ability to have access to that information quickly so that we can both price accordingly and provide service is crucial to our success."

It is easy to find evidence of how this talk of commitment to information translates into action. Progressive actually has more workstations than employees (7,000 terminals and

IBM-compatible PCs for just under 6,000 employees in the U.S. and Canada), and the company links its corporate operations via an integrated telecommunications network of voice mail, electronic mail and facsimile. Progressive's \$55 million annual IS budget represents a hefty 4.6 percent of its revenues. In recent months, the company has been rolling out its largest IS project ever: installation of a \$28 million automated claims-processing system whose development involved more than 200 people and more than 100,000 person-hours during a two-year period. This IS project has been supported with the most intensive training program in the company's history (see related story).



REX WOLF (left) and BRUCE MARLOW: Success is in setting the right rate for the risk.



CEO PETER LEWIS: increasing responsiveness

Moreover, as the insurance industry becomes increasingly competitive and the company seeks to expand beyond its core business, information and the IS operation will, if anything, play an even more important role in Progressive's operations.

Progressive's approach to insuring motorcycles illustrates the way the company turns information to competitive advantage—in this case helping Progressive to become the largest independent writer of motorcycle insurance.

Without the benefit of hard data, an insurance company would likely approach the motorcycle market by pricing its insurance according to the value of a bike, or perhaps by the size of the bike's engine: Yearly insurance premiums for a bike with a 100-cc engine would cost, say, \$50; a 500-cc engine would cost \$250, and so on. "It sort of makes sense," said Marlow. "The bigger bikes cost more, so the replacement cost is higher. They go faster, so the risk is higher. Unless you analyze the data, you don't really know."

The actual market situation, however, is much more complex. Some 1,000-cc motorcycles, for example, belong to "Mom and Pop, who go out with them only on weekends," Marlow said. "The rest of the time, they put [the bike] in their garage. It sits there, and it goes out on the trail only three months out of the year, as compared with Hell's Angels, who also are driving ... 1,000-cc bike[s]."

Progressive's success in the mo-

He published 56 books, saved his country. Not bad

The ability to do more than one thing well is often the difference between competence and excellence.

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escaping from a Boer prison camp in South Africa and crossing 300 miles of enemy territory. As the Colonial Secretary in the 20's, he founded Jordan, Iraq, and the Irish Free State.

As a historian he won the first Nobel Prize for Literature ever awarded for the quality of the *spoken* word as well as the written word.

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“Progressive worships at the altar of information. The edge that they have—and that puts them in a different class from their competitors—is that they have always been careful collectors of information.”

—Gerald Lewinsohn

the low-risk business, Progressive was able to capture that market segment. Competitors were put in the position of losing money on their 1,000-cc accounts overall or having to raise their rates and thus lose even more business. Eventually, anyone hoping to stay in the large-motorcycle market would have to try to emulate Progressive's segmentation strategy.

This approach has significant implications for Progressive's IS operations, and it places especially great emphasis on flexibility. “Once the responsible line managers have the intuition to identify the data element as something that they want to collect,” said Marlow, “then you have to have a data system” to collect and process that data.

“You learn that you cannot hard-code all these things,” added Senior



torcycle market depended on finding a way to distinguish between “Mom and Pop” and all the rest of the 1,000-cc bike owners, and the key to doing that turned out to be the ability to collect information about whether the applicant kept the motorcycle in a garage and was married.

“We collected that data for some period of time,” said Marlow. By taking a traditionally risky market—1,000-cc motorcycles—resegmenting it into low-risk/high-risk, and being able to charge significantly less for

Vice President of IS Wolf, who makes extensive use of data dictionaries and other database-management tools to devise systems that will support Progressive's segmentation strategies. “What is fundamental is for us to create the infrastructure and environment, and then to let people play in that sandbox,” said Wolf. IS supports and works with users and suggests ideas, “but the nature of our decentralized operation is such that you expect [the users] to be taking the initiative, to always be trying new

Claim Jumping

Faster action means better service, lower costs

“Our claims function was almost at the quill pen stage—all hand-written policy files and virtually no automation—and in less than six months, we have converted it from being paper-based to being fully electronic-based,” said Bruce Marlow, executive vice president and chief operating officer at the Progressive Corp. insurance company. “The new claims-processing system is going to have an astounding impact on our business.”

The new system replaces the paper-oriented approach that handled an average of more than 1,250 claims a day via hard-copy files, hand-written documentation and numerous forms. Now when a loss is reported, the pertinent information is entered directly into the system. Claims representatives are able to immediately access customer files, review claim status, and answer

ideas. We try to create an environment that facilitates that.”

The constant change that characterizes this highly competitive industry further accentuates the need for flexibility. Though Progressive's approach to motorcycle insurance provided the company with a significant marketplace advantage for a while, its competitors eventually came to follow Progressive's lead. “If your principal competition uses the same rating factors that you use,” said Marlow, “it compromises your competitive advantage. . . . It is a constant struggle to see who gets stuck with a mispriced segment of business.

“These things never stay the same, and anyone who thinks that he is going to build a monument and thinks that it is going to stay in place is going to have a very unpleasant



MARLOW: instant adjustment

questions quickly and accurately.

One important change will be a greatly enhanced ability to provide 24-hour-a-day claims service. For example, at any hour of the day, an adjuster will be able to verify that someone has coverage, and to electronically transfer files for immediate and complete information regarding the customer and the claim. "We can begin to adjust the claim . . . as soon as the person calls us, which we hope is right after the incident occurs," Marlow said.

The increased speed will benefit Progressive in at least two ways, according to Marlow. For one thing, "the online, real-time handling of

the claim costs us less," he said. "In a service business, if you do it as the event occurs, it costs less than if you inventory it. Inventory management increases the costs because you have to manage the work-in-process. You also have the problem that the information in the stacks is aging. . . . If you do it faster, it is a much simpler process, and we find that our business units that process [claims] in two days cost less to operate."

A second benefit has the potential for an even higher payback. "The nature of accidents is that the sooner you can get to the scene . . . and work with the injured parties and start solving their problems, the happier that everyone will be, and the faster and better the settlement will be on the claim."

The faster the response, said Marlow, the more likely claimants are to settle for less money. "It is not because you are talking these people into a settlement they won't take; it is because they got better value. From our point of view, it is a huge win-win. You get happier customers, you get positive market reaction, and you get phenomenally better business results from it."

—B.G. Yovovich

life. The tide keeps coming in, and the water keeps lapping up around you."

Internal developments at the company have presented their own challenges for IS. For example, Progressive has been implementing a major organizational shift toward decentralization and moving from a product-management structure with countrywide managers for various products to a decentralized divisional structure with state-oriented operating divisions.

According to Progressive CEO Peter Lewis, "Our objectives for the reorganization are to move more functions closer to customers, match individual strengths to business needs and . . . provide for management development."

In particular, the decentralization effort makes sense because "insur-

ance is not a countrywide business," said Marlow. "It is a state-by-state business, with different laws and regulations in each state. Our division president in Florida is totally responsible for Progressive business in Florida. The claims function, the policy-services function, the pricing function and the sales function all report to that person, and it has given us, as an organization, a much more holistic view of the business."

The change in organizational structure has had major implications for Progressive's IS operations, especially accentuating the need to integrate the various systems within a specific division. For example, several major system enhancements were introduced in recent years to improve Progressive's capability to match different policies to one customer and to track the company's ongoing rela-



"Technology is intrinsic to the nature of the insurance business. Having information about the exposures and losses and the ability to have access to that information quickly so that we can both price accordingly and provide service is crucial to our success."

—Bruce Marlow

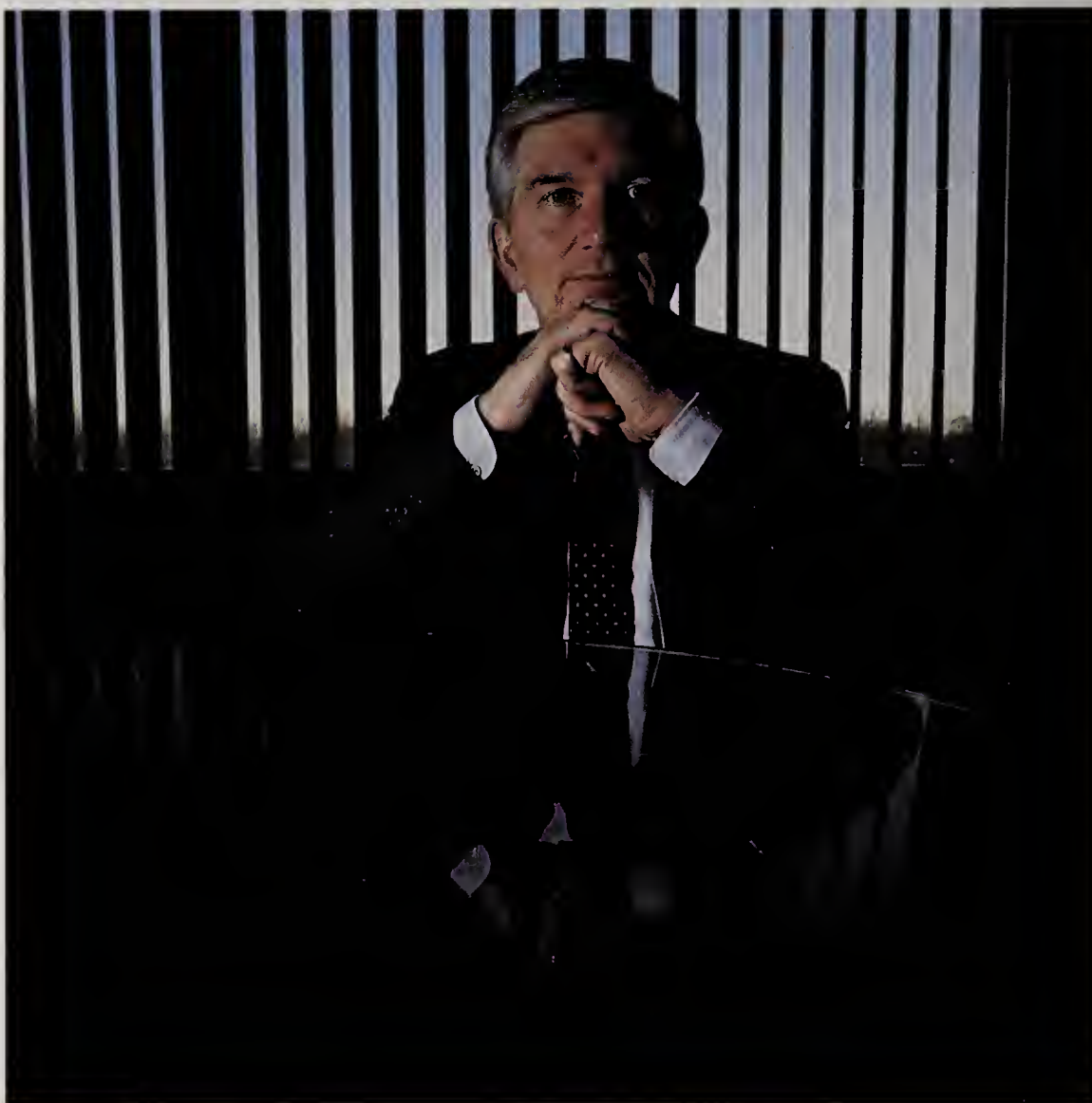
tionship with that customer, no matter what the transaction. The biggest problem has been the lack of "common data definitions," said Wolf. "If you represent a name 20 different ways in 20 different systems, it doesn't matter what the underlying technology is; they don't match." For instance, a person's name might be represented by a first initial and last name on one policy and be fully spelled out on another. It might even be misspelled. "Data integrity wasn't

PHOTO ABOVE LEFT BY JACK VAN ANTWERP; PHOTO ABOVE RIGHT BY C. SEGHERS/STOCKMARKET

important" when the system was developed. Such inconsistencies permeated the organization's files. "Even social-security numbers and taxpayer IDs are not standardized—sometimes they have dashes, sometimes not."

One important step the company has taken has been to standardize the way certain kinds of data will be represented. "We have made the commitment to go through all of that—redefine the data, redesign the systems and fields," said Wolf. "We have standardized on a little over a hundred data items: 'This is the way an identifier will look. If you have an address, this is the way it will look. If you are going to express a premium, this is the way it will look.'"

Development of the standard data definitions took nearly two years to hammer out. "All the new systems we build will incorporate those standards," said Wolf. He added, however, that "the company is still trying to decide what to do about the old sys-



WOLF: *The IS infrastructure should "let people play in the sandbox"—in which there is room for plenty of new sand, now that Progressive is expanding into commercial trucking insurance.*

role in Progressive's dealings with the commercial trucking market, which will be more dependent on providing safety-related services rather than just handling the traditional risk-sharing aspects of insurance coverage.

These commercial trucking companies, Marlow explained, are usually large enough financially that "they don't need an insurance company, [because] except for large catastroph[es], they can bear the risks themselves. What they do not have is the capacity to understand the accident mechanisms that are at work. . . . They don't have the capacity to develop the specialized knowledge it takes to properly handle a claimant, and they can't produce a network of 180 offices countrywide to service the claim as it happens."

Progressive expects to use the knowledge it gains from its information systems to profile accident patterns. It will use these patterns to help customers develop programs that will lower their accident rates. "With large truck fleets, you are always trying to determine the primary

tems. How do you convert them? When do you convert them? Do you convert them [at all]?"

IS must also be able to "provide access to all information within two seconds from anywhere in the country for anyone who needs it, and our challenge is to figure out how we can share our data across all the markets and all the people in our company."

At the same time that the IS operations have been called upon to adjust to the new decentralized organizational structure, they also have

been asked to play an important role in Progressive's strategy to expand from its core business of non-standard auto insurance into the commercial trucking insurance business.

"Information systems are important [to this venture] because this is an area in which we have new types of vehicles," said Marlow. "So we have a major challenge to start collecting the basic kind of information we need to run the business well."

In fact, information systems are slated to play a much more central



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causes for loss," Marlow explained. "Is it the nature of the drivers that they have? Is it their hiring practices? Is it the routes that they travel? Is it a problem with the way that the trucks are equipped?"

Marlow sees this type of partnership relationship as an important trend in the insurance industry in the 1990s. In anticipation of this trend, Progressive built "a customer information base that allows . . . large customers to get direct access [to] all their policy claims information," said Marlow.

"The nature of our decentralized operation is such that you expect [the users] to be taking the initiative, to always be trying new ideas. We try to create an environment that facilitates that."

—Rex Wolf

So far, Progressive's venture into commercial trucking insurance has shown mixed results. As Duff & Phelps' Vargo observed, "The commercial trucking business is very different from personal auto, and the jury is still out as to whether the skills [Progressive has] developed in one market will translate into the other market."

Another responsibility that falls to Progressive's IS group is the task of tracking those emerging technologies that are likely to play an increasingly important role in the company's operations and "to identify opportunities and suggest pilot programs," said Wolf.

For example, Progressive is currently looking at the use of radio-frequency modems that make it possible

TECHNICAL PROFILE

Progressive Corp. of Cleveland is one of the leading players in the non-standard auto-insurance market—providing coverage for drivers who have been rejected or canceled by other insurers. Founded in 1965, it has 38 operating subsidiaries and two mutual insurance company affiliates. Of 300 property/casualty insurance company groups, Progressive ranks 37th in size.

Large and Mid-Range Systems: Progressive uses IBM (3090-600E and 3090-600S) mainframes and IBM AS/400, IBM 9370 and IBM Series/1 minicomputers. Users are located in 214 remote offices and access data through 7,000 workstations (terminals and IBM-compatible PCs).

End-User Systems: The company has approximately 1,700 IBM and IBM-compatible PCs, 40 Macintosh PCs, and over 200 laptops with dial-up capability.

Software: Mainframe operating system software consists of MVS/ESA (with DOS/VSE on the IBM 9370 distributive processors). OMEGAMON is used to monitor the MVS system.

Database software consists of IBM's DB2 1.2 and Computer Associates'

IDMS/R running in a multiplatform environment.

Online software includes CICS 1.7 (Customer Information Control System) and SHADOW from Pilot Executive Software. Over 4,100 users access VM/PROFS for electronic mail. The major development tool is TSO/E.

Fourth-generation languages include FOCUS from Information Builders Inc., SAS from SAS Institute Inc. and RAMIS from On-Line Software Inc.

Networking: Progressive's nationwide voice-and-data-integrated backbone network consists of T1 and fractional T1 and links 189 Progressive and 27 non-Progressive sites. A substantial point-to-point and multipoint high-speed analog network is hubbed off of the backbone. The network uses IBM SNA with Netview, 3745, 3725 and 3174 cluster controllers, NetSpy, and Racal-Milgo's Communication Management System. The voice terminates in ROLM CBXs, most of which provide voice mail (PhoneMail) capability.

The LAN is IBM Token Ring with migration plans to OS/2 Extended Edition. Evolution to fixed-disk-drive interface is anticipated, with optical imaging and storage being the prime driver. Primary LAN applications will be PS/2-based.

for a laptop computer to tie into a Motorola-supplied telecommunications network without access to a phone line. This would make it possible "for a claims adjuster at the scene of an accident to access the mainframe," Wolf said.

They are also studying ways in which the company might use expert-system and artificial-intelligence technologies. "Expert systems represent a classic opportunity for us," said Marlow. "We have a mass of organizational knowledge about particular problems—for example, what to do with an injured person [or] how to solve a particular customer problem."

So far, said Wolf, the company has used expert systems on their help desk (a "relatively mundane but . . . logical first step") and in the transportation area to provide advice about what to do for accidents involving spills of hazardous chemicals. This particular application is a classic use of expert-system technology, he said, involving information that is

"highly technical [and] time-sensitive."

Progressive has decided to bypass the use of imaging technology, at least for now. "The usefulness of imaging depends somewhat on the industry," said Wolf. "It is less useful when you have all kinds of information that can't be scanned," as might be the case on an insurance claim form. "At this point, we have decided to try a different approach and to focus on getting the data electronically at the source."

Even more important than new technologies, however, is the change in "the orientation of the people that we have running the business," said Marlow. "People are thinking more broadly now. They are seeing opportunities that we never saw before—simple things like how we bill customers and how we interact with our agents—that we think have enormous . . . potential for us." □

B.G. Yovovich is a freelance writer based in Evanston, Ill.

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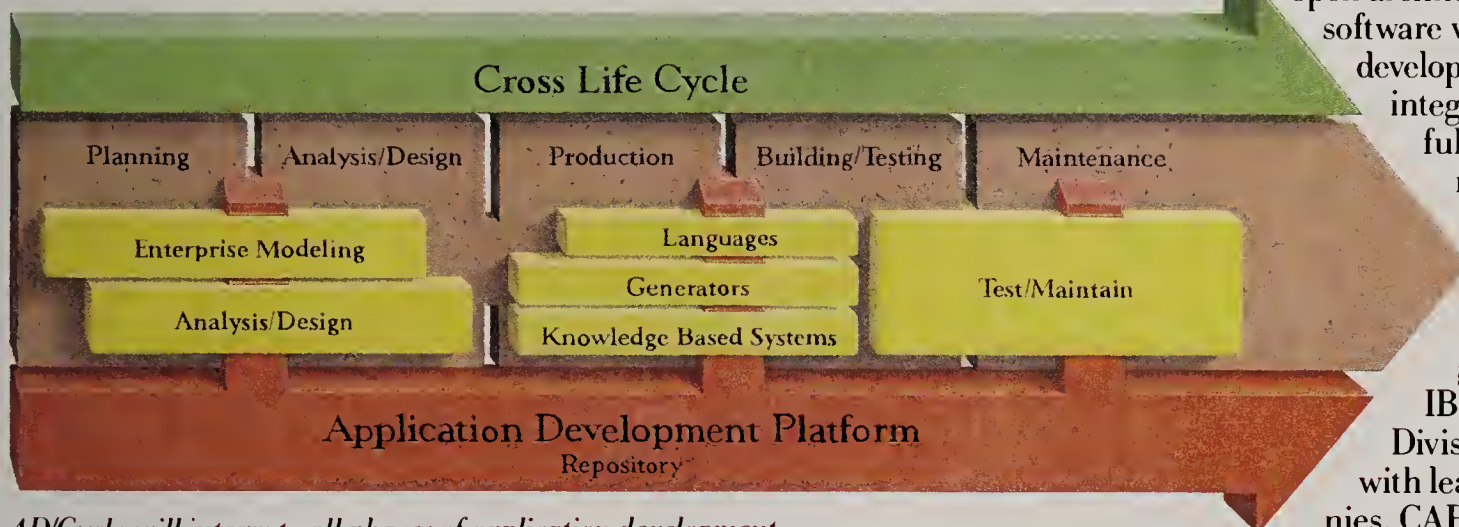
Worse, applications now take so long to create, they can be obsolete

before: a consistent set of standards. Within it, all phases of the process (see diagram) can be coordinated.

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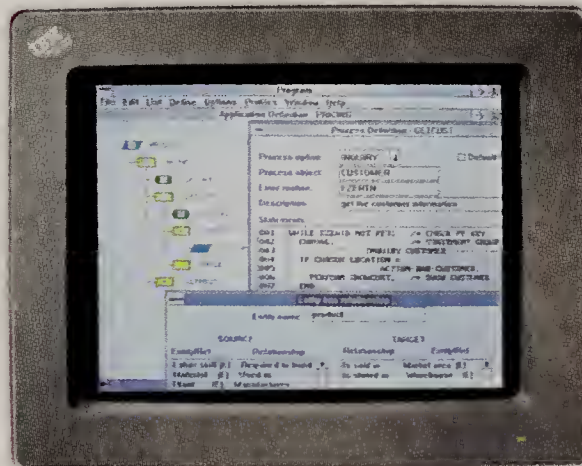
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GAIL BARNETT: *Continental Insurance's imaging system has opened as many doors as it's closed filing cabinets.*

Sure, image technology can eliminate file cabinets. But advocates believe that, used properly, it will also transform the nature and flow of work itself.

All her working life, Maureen Phillips' world had been bounded by paper. Sheets of it covered the desks in her office; stacks obscured their horizons.

Now, the paper is largely gone, swept away by a computerized imaging system, and even the staunchest technophobes on her staff have welcomed the revolution.

"Once they'd seen it in action," recalled Phillips, vice president of investment and pension sales at John Hancock Financial Services in Boston, "they'd go 'God, life is so much easier.'"

Deborah Ward's experience in the hazard-insurance department of Banc One Mortgage Corp. in Indianapolis was similar. "My worst skeptic is now the most solid convert," Ward said. "It made her job a lot easier."

Likewise, said Gail Barnett, office services manager at the

Chicago office of Continental Insurance Co., "People are a heck of a lot happier . . . [and] morale . . . has improved immensely" since an imaging system was installed. Of the clerical workers at pre-imaging Continental, Bar-



RALPH ALPER: *scratching the surface.*

THE IMAGE PROCESS

BY PAUL KONSTADT

PHOTO LEFT BY NEIL MACDONALD/PHOTO ABOVE BY ROBERT EARNEST

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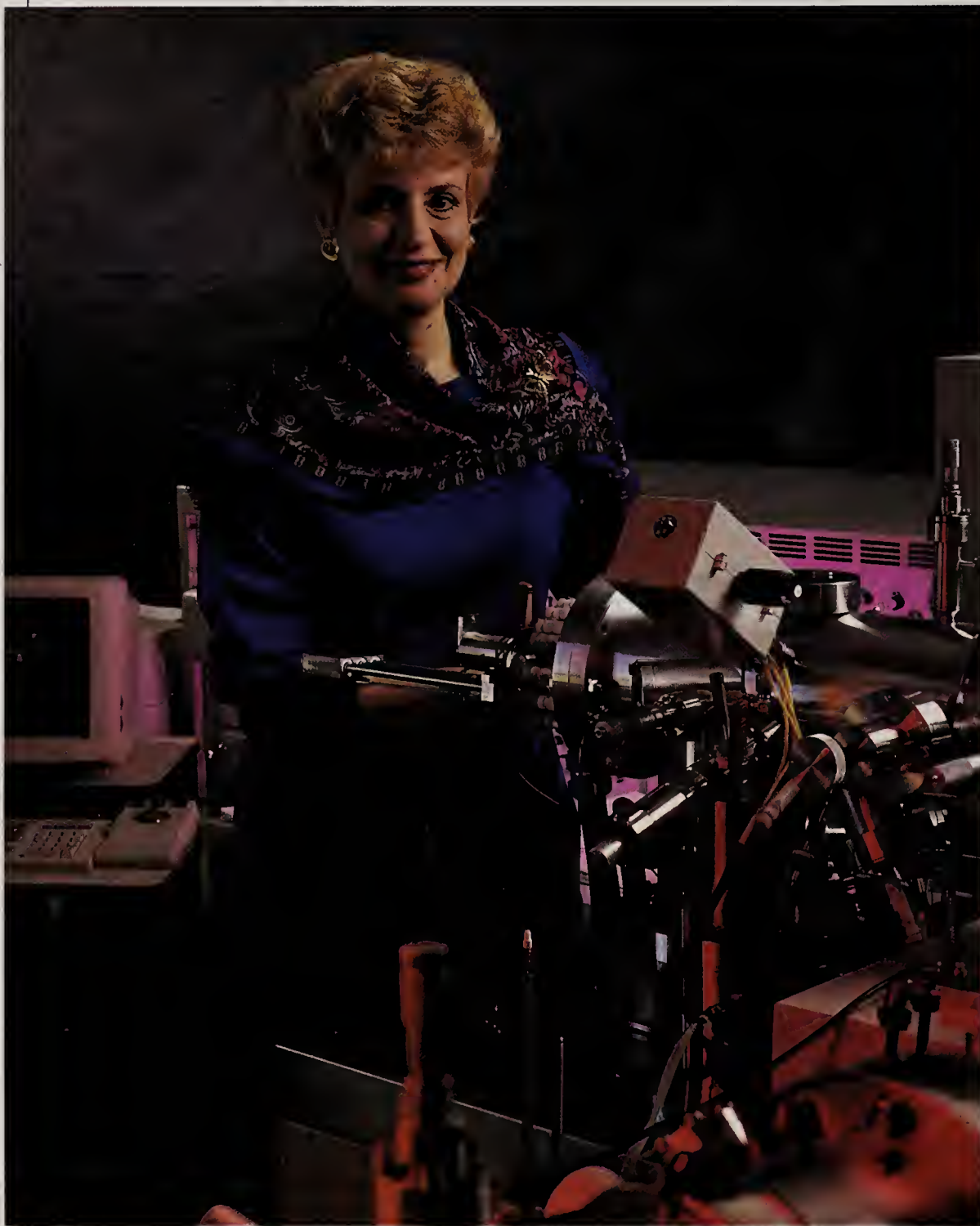
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ANNETTE HAWK: Faster drug approvals bring more bucks to the bottom line.

Companies are finding that their imaging outlays pay unforeseen dividends, and that their initial applications often don't even begin to exploit the systems' latent power.

nett said, "I can't see how they ever came to work every day."

Just as gunpowder, which was invented by the ancient Chinese for fireworks, ultimately transformed hunting and warfare beyond recognition, electronic image storage and retrieval has become far more than a mere semiconductor-controlled file cabinet. The typical imaging system includes scanners, laser printers, and high-capacity optical-disk data storage devices, all managed by a micro- or minicomputer running specialized document and work-management software. It be may comparatively costly, but companies that invest in the technology are finding that their outlays pay unforeseen dividends, and that their initial applications often

don't even begin to exploit the systems' latent power. Document access times are cut from hours or days to minutes or seconds, staffing needs have been reduced, expensive storage space has been compressed, and perhaps most importantly, organizational effectiveness has improved enormously.

"We have reduced our mispayment rate almost to zero," compared to a departmentwide average mispayment rate of "around 3 percent," said Mary Leyland, deputy director of the vocational rehabilitation and education service in the federal Department of Veterans Affairs in Washington.

Two years ago, the department began using an imaging system put together by American Management Systems Inc. (AMS), an Arlington,

Legal Tender

Despite the absence of a clear track record, electronic duplicates of paper documents ought to pass muster in most jurisdictions

Paper is so fundamental to the legal process that red tape—the universal encumbrance—was originally the substance that bound legal documents. That tradition has led some lawyers to counsel against adopting imaging for the storage of important documents, since some courts have not explicitly embraced the technology, and the value of images as evidence might be questioned.

Experts in the field, however, argue that most of those fears are unfounded; most states' (and the federal courts') rules of evidence allow computer imaging documents to be used in legal proceedings.

Va., consulting firm and imaging systems integrator, to support a new educational-benefits program. Veterans' requests for benefits and their supporting documents are handled by the system, which also includes word processing and financial software for letter- and check-writing.

"The net effect of [this integrated system] is that we dramatically improved our service to vets," Leyland said. "Now we can respond in real time to a veteran's inquiry. It used to take three days."

At a McDonnell Douglas Corp. unit in St. Louis, executives allowed their corporate IS group to talk them out of simply storing old accounts-payable records on microfilm. Instead, they purchased a Wang Laboratories Inc. imaging system, using it first to record all incoming forms and

invoices, then to move the information through the approval and payment process. Their accounts-payable department was transformed almost beyond recognition.

"They are handling three times the volume they were doing before they put in the system," said Steven Elliot of Andersen Consulting, who directed the installation for Wang. "They consolidated two other divisions in there."

"It worked out really well," said Ralph Alper, a principal senior specialist at McDonnell Douglas Aerospace Information Services in Cypress, Calif. "We also realized that we, as a company, are just barely scratching the surface."

Officials at John Hancock's financial services unit had a similar experience after they installed a FileNet Corp.

system to manage payments to annuity and pension beneficiaries.

"It has been more effective than we thought it would be; it exceeded whatever expectations we had," said Hancock's Phillips.

Other users report unexpectedly large savings in personnel or overhead costs after they installed electronic document handling systems.

At the Continental Insurance Co. office in Chicago, for example, 25 file cabinets that took up \$50,000 per year worth of floor space were disposed of when Gail Barnett had one of Eastman Kodak Co.'s microcomputer-based systems installed to file, store and retrieve claims documents.

"We expected the system . . . to pay for itself in five years," Barnett said. "It paid for itself in about 15 months."

"A computer-generated duplicate would be just as admissible as the original," said Joseph P. Zammit, a partner in the New York law firm of Fulbright Jaworski & Reavis McGrath, who specializes in computer litigation.

"It's just a question of authentication," agreed Steven Bauer, a Boston attorney who teaches computer law at Boston University Law School.

And just in case there are lingering doubts, ". . . you can always save the paper after you scan it," suggested Al Tauber, market development director for a division of Citicorp Information Resources, and a long-time imaging partisan.

"Nobody really has an active concern on legal admissibility except those who are interested in resisting the technology," he added.

Outside the courtroom, government regulators seem to be moving to embrace the technology. Defense department auditors, for example, accept an electronic imaging system installed at a McDonnell Douglas Corp. office in St. Louis as a substitute for the more traditional paper trail.

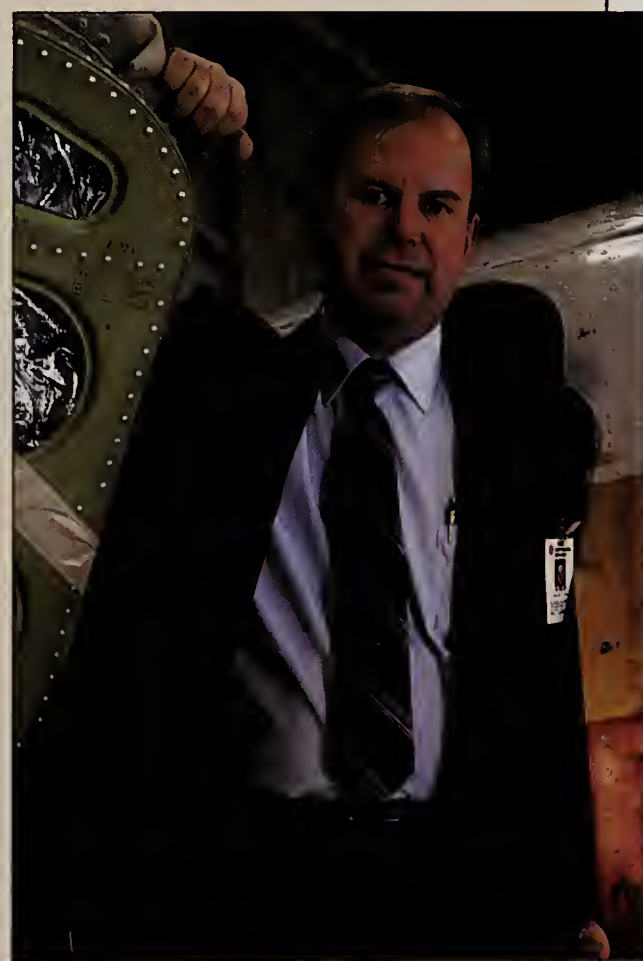
"We thought it would be kind of a

tough sell, but they related to it," said Steve Elliot, an official with Andersen Consulting, the firm that installed the Wang imaging system at McDonnell Douglas. "The issue is always 'Do you have the right controls? Is it well managed?' If the answer is yes, then it's never an issue," said Elliot.

Continental Airlines Inc., which uses a Kodak imaging system to archive its aircraft maintenance records, learned the same lesson from the Federal Aviation Agency when the FAA audited Continental's operations last year. "The individual [FAA] inspectors love it; they think it's the right approach," said Greg Young, director of aircraft records for the Houston-based carrier.

Currently, maintenance documents are scanned into the system, then stored off-site indefinitely. But Young has asked for FAA approval to dispose of the paper after it is scanned. Regulators have yet to make a final decision, Young said, but ". . . we've gotten support from the regional FAA office on down."

Young also predicted that doubters would be silenced, and that imaged evidence would some day be as com-



GREG YOUNG: *Imaging will fly.*

monplace as paper is today. "The technology is going to overwhelm the legal process. It's moving so fast that I don't think anybody can stop it."

—P. Konstadt

PHOTO BY BOB WERRE

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—Deborah Ward

"One [of our] claims-accounting departments doesn't exist anymore," its work now being done by the automated unit, she added.

"We could almost show a pretax profit with the head count savings," said John Pentangelo Jr., vice president of revenue and accounting services for North American Van Lines Inc. of Fort Wayne, Ind.

Pentangelo bought a FileNet system to take care of customer billing. He estimated that he was able to trim the clerical staff by 20 percent because of the reduced paper handling, and he expects more savings as the company learns how to exploit the power of the system better.

Users also report that the power inherent in their systems has made it possible for them to do things that were previously impossible or even unimaginable. "It's opened up a lot of new doors, things that would never cross minds to do before," said Continental's Barnett. As an example, Barnett cited the case of an underwriter who wanted to see all the

claims larger than \$50,000 that were filed against a certain client during 1987—information often so embedded in paper files that it is inaccessible, but which, if available, could be of tremendous value for policy rating and risk management.

With the imaging system, it took one person "eight to nine minutes" to get the information to the underwriter's desk, Barnett said. "Before, it would have probably taken four

clerks a month to go through each account."

To information systems managers used to protecting equipment from disaster with temperature and humidity controls, electrical surge suppressors and exotic chemical fire extinguishers, thoughts of actually aiding other company departments in post-trauma recovery may seem far-fetched. But electronic imaging has made prophylactic duplication rou-



MAUREEN PHILLIPS: results with imaging that exceeded original expectations

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Making Do With Less

Not everyone wants or needs image technology. That's why microfilm systems are still big sellers. Then, too, there's always eliminating paper completely . . .

Many organizations remain unconvinced about the intrinsic benefits of electronic document image storage—or at least of the advantages to be gained by a major investment in the technology at this time.

Imaging alternatives like microfilm may require smaller outlays up front, or lower operating and maintenance costs down the road. They may also solve a given business problem more precisely and demand less user attention than imaging for system design and installation.

Traditional microfilm market leaders Eastman Kodak Co., of Rochester, N.Y., and 3M, of St. Paul, Minn., also sell electronic imaging equipment, but both acknowledge that their film systems still outsell their imaging products—at 3M “substantially,” and at Kodak by a unit ratio of “two to one,” according to official company sources (although the dollar value is equal for both types of systems).

One user who has decided against electronic imaging for a current need is Joanne Neal, manager of the underwriting administration department for Motorists Mutual Insurance Co. of Columbus, Ohio.

“We needed to do something with our records retention,” Neal said of the firm’s decision to purchase a computer-supported microfilm storage and retrieval system from Kodak. Neal had considered electronic imaging and optical-disk storage systems, but was deterred by a lack of off-the-shelf products suitable for her department’s particular needs. “We were not in the position to offer a lot of research and development monies to optical disk,” she said.

In contrast, the Kodak microfilm system records and indexes every document as it comes in, allowing a user to later locate the filmed image and generate a photocopy readily. That hardcopy can be physically carried or sent by facsimile to any user that needs it “within a four-hour period,” Neal said, fast enough for the company’s archival needs.

Selecting a similar system for similar reasons, Fred Curley, manager of administrative services for the Service Federal Credit Union in Portsmouth, N.H., said that “optical disk was just too expensive. . . . The scanning process was just way too slow for us to use” for the large volume of credit and account applications, transaction records and other vital paper that the credit union needed to deal with. Instead, Curley purchased a microfilm system that produces dual negatives, one for use in-house, the other for secure off-site storage.

If microforms are the more traditional, lower-technology alternative to imaging, then constructing an entire process to rely on E-mail and EDI—abandoning paper entirely—is the more radical option.

“Get the paper out of the loop entirely,” suggested Wick Keating, vice president at American Management Systems Inc., a consulting firm and systems integrator in Arlington, Va. That could work particularly well for an internal process like personnel, Keating said, “because most of that stuff originates on computer anyway.” In addition, in at least one accounts-payable operation he studied, “having suppliers bill electronically was definitely more cost effective” than moving their paper invoices through the bill-paying process as images.

—P. Konstadt

tine, according to Donald Reisse, first vice president of commercial lending services at Exchange National Bank of Chicago.

“When paper burned, that was it,” he said. “Now, we’ve got backup copies held off-site,” duplicate disks made periodically—and at nominal cost—by the imaging computer system.

“It’s a capability that never existed before,” he said.

Some veteran imaging users have found that the technology allowed them to change their basic mode of operation. “We’re not making as many copies of things as we used to,” said Annette Hawk, manager of office automation systems for SmithKline Beecham Animal Health in West Chester, Pa. Hawk’s unit of the multinational drug company uses its Wang imaging system to assemble and prepare license applications for new veterinary medications.

“We used to make two to three

“Imaging, much more than most other data-processing systems, really does generate more fundamental changes in the organization. One of the lessons that people have learned is that the real benefits come from thinking about how to redo the business process, rather than simply automating it.”

—Wick Keating

copies of everything; now we are getting rid of copies that we had in the cabinets. We've already eliminated a lot of paper out of here," Hawk said.

Regulatory approval for new drugs can take as long as 8 to 10 years, much of that time used to assemble applications and supporting documents for the federal Food and Drug Administration, and to shift those files back and forth between the drug manufacturer and FDA reviewers in Washington. A SmithKline Beecham manager's ability to locate any one of a thousand or more pages quickly can give the company a priceless advantage, Hawk said.

"[T]hey don't have to go into the archives to dig up the information, they sit at a computer and pick out the documents they want." That, in turn, can earn SmithKline Beecham its drug licenses much more quickly, allowing the company to get its products to market faster, which means "... more dollars on the back end," or bottom line, Hawk said.

A business's customers can experience the power of imaging technology even if they never have any direct contact with the application. That, in fact, was the chief reason Banc One's Ward opted for imaging rather than less expensive microfilm document storage of her department's customer-service records.

"In the past, it would take anywhere from five to seven minutes to find a file folder . . . now it takes less than 30 seconds," she said. That kind of speed gives the customer the sense that the company is "on the ball . . . and leaves the impression with the customer that you care.

"The longer you keep them on hold," she continued, "the more they feel you are incompetent."

With only 1,300 or so computerized image-storage-and-retrieval systems installed in the United States by the end of 1989, according to market researchers at BIS CAP International in Norwell, Mass., imaging technology hasn't emptied more than a tiny fraction of the nation's corporate file rooms. But BIS CAP's prognosticators expect the number of imaging systems to



WICK KEATING: *Plan on plenty of pre-implementation acculturation work with users.*

double in 1990, and almost double again each year, at least through 1993. That growing commitment of users to the technology has led some experts and veteran users to caution that exploitation of imaging calls for more than just the purchase of a black box and some software.

"You have to take a serious look at the work and restructure it in a meaningful way," said Steve Elliot of Andersen Consulting. "You really do have to get in there and understand . . . why the documents flow the way they do." Unless you do that, said Elliot, you'll merely have "a very expensive microfilm replacement."

"Imaging, much more than most other data-processing systems, really does generate more fundamental changes in the organization," said Wick Keating, a vice president of AMS. "One of the lessons that people have learned," he continued, "is that the real benefits come from thinking about how to redo the business process rather than simply automating it."

According to Elliot, as much as half of the improvement that firms see when they install imaging comes from redesigning the work process. "But the technology itself is the enabler for a lot of changes that can't be done otherwise," he added.

A vivid example of this occurred at the Department of Veterans Affairs, as long-time claims workers encountered electronic document files for the first time. "The cultural change was dramatic," Leyland said. "We went from pencil and paper to everything on a screen."

Claims workers, she said, traditionally had the veteran's complete file on their desks when they dealt with his or her case, but the planning for the installation of the imaging system allowed them to see that they needed only a handful of documents from the recent past to solve virtually all problems, not the entire dossier. "It was a Teddy bear, a security blanket," Leyland said. "It [the dossier] was there, but they didn't need it. But nobody could have convinced

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**Effective
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them of that until they had the information available on the system."

McDonnell Douglas's Alper said that process of change is also underway at his company. "We are finding

that if we really look at it, paper cuts across a number of departments and functions," he said, adding that if work flow remains as it was in the days of paper, image technology won't work properly.

As an example of a candidate for consolidation through imaging, Alper cited McDonnell Douglas' purchase-order process, which currently involves "... a half-dozen functions at three or four different locations" that would all need access to the same image database.

With an imaging system, those functions could be performed better at a single location with a unified staff, and the computerized organization could serve a larger number of clients within the corporation.

The path to change is often obscured until after the imaging system is up and running, making trial and error an important part of the process.

"These systems are so new that it's only after you install and start using them that you realize there are so many other things you can start doing," said Alper. "There's a lot of potential you just can't see."

For AMS's Keating, that means first-time buyers of imaging systems should "... plan on devoting more resources to [preparing for] the installation; to working with the users" to exploit the system effectively.

Image technology will be more useful for some organizations than for others.

"A centralized organization with a centralized paper flow" is how Jerry Thode, a Los Angeles-based principal with the consulting firm of Deloitte & Touche, describes the ideal candidate for imaging. Said AMS's Keating, "They must have a heavy volume of paper and also a lot of handling of the paper, a lot of moving it around, a lot of retrieval. The more of that, the more imaging pays off."

Thode and Keating both pointed out that communications is one of the major technological bottlenecks for imaging, since the cost of transmitting a typescript page electronically as an image is about six times higher

than the cost of sending a similar page in the form of computer text.

"The technology isn't quite up to delivering a distributed solution, since it is very expensive to move those images across distances," Thode said.

Although the applications themselves may be unique to each business's circumstances, those who have invested in imaging recount stories with common themes.

In most cases, the proposal to implement imaging systems seems to

*Some organizations
will find imaging more
useful than others.
Best candidates are
centralized
organizations in which
a heavy volume of
paper is moved or
handled frequently.*

have originated with an operating manager, the person responsible for a function where the volume of paper being handled had become problematic. In most cases, too, the proposal was supported by superiors who agreed that the strategic value of image technology was at least as important as its financial benefits.

Allied Signal Aerospace Co.'s Garrett Fluid Systems division in Tempe, Ariz., faced what has become a typical scenario when they bought their Wang Integrated Imaging System.

"We were losing key documents," reported Mark Fosenburg, an electrical test/software development engineer at Garrett. "We had to cut the percentage of lost documents and search time down ... to remain

Leading Image Processing Vendors*

COMPANY/LOCATION	PRODUCT NAME
3M St. Paul, Minn.	Docutron, Doculink
Access Corp. Cincinnati	EDICS
DISCORP Simi Valley, Calif.	Digital Document Image System
Eastman Kodak Co. Rochester, N.Y.	KIMS
FileNet Corp. Costa Mesa, Calif.	Document Image Processing System
IBM Corp. White Plains, N.Y.	Image Plus
Image Business Systems Corp. New York	ImageSystem
Imtech Optical Systems Corp. San Francisco	FIND
LaserData Inc. Tyngsboro, Mass.	LaserView
Litton Integrated Automation Alameda, Calif.	Docuvision
Recognition Equipment Inc. Irving, Texas	System 100
Summit Software Corp. Atlanta	Laser Base
TAB Products Co. Palo Alto, Calif.	Laser Optic Filing System
Unisys Corp. Blue Bell, Pa.	Infolmage
ViewStar Emeryville, Calif.	ViewStar Document Image Processing System
Wang Laboratories Inc. Lowell, Mass.	WIS

SOURCE: DELOITTE & TOUCHE

*This chart is an excerpt from Deloitte & Touche's "Detailed Research Document on Optical Disk Based Document Imaging Systems," which will be available through the Association for Information and Image Management in Silver Spring, Md., after April 1, 1990.

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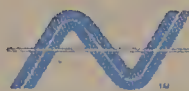
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competitive in the aerospace industry."

The biggest hurdle Fosenburg had to clear was convincing managers, who "... wanted to see tangible results now," to invest in imaging even though the real value only emerges over time.

A similar hurdle was faced by Jacklyn Popiul at First Nationwide Bank of San Francisco, who recently bought an electronic image storage system from 3M in St. Paul, Minn. "Quite frankly, I did my homework," said Popiul, a vice president at the bank. "I could prove that we were going to get much faster customer service ... and get a higher-quality product."

That approval process also required a persistent lobbying campaign. "If you were standing still for two minutes, I'd grab you and show you what [the image storage system] would do for your department," she said.

Continental Insurance's Barnett also faced a paper crunch, but she found willing ears when she proposed a technological solution to her superiors—a boss who "has an open mind" and a regional vice president who is "technically venturesome."

That put Barnett's Chicago branch office a wave ahead of the corporate headquarters in New York. When Barnett described her system to a New Jersey-based colleague, she was told, "I can't believe you're doing this [when] we're just setting up a study group."

"Since then," she said, "I've had at least 30 people here to demonstrate the system [to], and the corporate office is very interested. ... We started it as a way to attack these file cabinets, but it's really turned into something exciting."

While imaging advocates have to fight all of the conventional economic and technical arguments in their internal political debates, there are also some pitfalls unique to imaging that should be avoided, say consultants familiar with the process.

Among the common mistakes are



STEVE ELLIOT: Reorganize work flow.

*Common mistakes
are choosing a trivial
function for the
first test and phasing
in the new system
too slowly.
It is also important
to map out the
conversion process so
as to avoid
disrupting operations.*

choosing a trivial function for the first test of the technology; phasing-in the application slowly rather than setting up the new system and switching over all at once; and not mapping out the conversion process adequately to avoid disruptions to operations.

Any of these missteps can result in the failure of an imaging experiment.

"It's not a failure in the sense that the system doesn't light up," said Andersen's Elliot, "but it is a failure in the sense that it doesn't deliver business value that is worth the time and money."

Another kind of trap lies hidden among the financial arguments. The traditional terms of the debate—return-on-investment and payback period—don't usually work for imaging, because they cannot account for sub-

jective improvements. "Existing traditional measurement systems do not award points for strategic values," said Thornton May, an imaging expert with the consulting firm of Nolan Norton & Co., a division of Peat Marwick Main & Co., based in Lexington, Mass. "How can you look at customer satisfaction or employee satisfaction ... and say 'What dollar value do you place on those?'"

Winning approval for the purchase of an imaging system has proven to be just the first hurdle to be cleared. End users face potentially dramatic changes in their jobs and environments; changes they must accept willingly and wholeheartedly, not under threat, if the installation is to be successful.

This is not a technology you can dictate the use of," cautioned May.

Preinstallation training was almost-universally cited by experienced imaging users as a key element of success. Perhaps not surprisingly, employees already working with some kind of electronic information system seemed to have an easier time accepting imaging.

"[Employees] hate the idea of change ... they find it hard to adapt," said Donald Reisse at Exchange National Bank of Chicago. Reisse credits well-laid groundwork with his bank's success with its Kodak system. "It's how you set up with the staff, how you market the thing to them in the first place," he said.

At John Hancock Financial Services, the real problem was getting employees to feel comfortable without paper, according to Janet Dwyer, the FileNet coordinator.

One of the supervisors in the department Dwyer was automating asked that all mail be routed through her desk, a request that Dwyer felt compelled to deny. "The supervisor felt she was losing control," Dwyer said, "... but after a week of discussion and explanations ... she saw that you have better control.

"I think time [to adjust] has a lot to do with it," Dwyer said. ☐



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SAY IT AIN'T SO... OK IT AIN'T SO.

Consultant Bruce Rogow isn't afraid to swim against the tide, especially when it's full of you-know-what . . .

Bruce J. Rogow's irreverence for platitudes has given him a reputation as the kind of guy who mentions that the emperor has no clothes on. "I just have this thing in the back of my mind," he said in a recent interview. "It's a bell that rings whenever everybody is saying identically the same thing. Whenever I hear that, I say, 'Whoa.' "

Rogow, executive vice president for worldwide analytic resources at the Gartner Group Inc., an IT research firm in Stamford, Conn., said, "Whoa," a number of times during the interview. He balked at mention of the trend toward non-technological CIOs—"Tinkerbells flitting around" while their companies face technological anarchy. He cautioned that revamping a company's information systems on the model of Mrs. Fields Inc., Otis Elevator Co. or American Airlines Inc. may be all the rage, but it

BY KATHLEEN MELYMUKA

PHOTOS BY MELANIE EVE BAROCCAS



won't bring competitive advantage. Supportive chief executives are nice, he observed, but CIOs don't need them. He warned that aligning IT with business strategy may be the most embarrassing thing a CIO will ever do. And while information may be a lot of things, he said, it ain't power.

Despite these iconoclastic views, Rogow sees himself as more historian than contrarian. He predicts that the trend toward end-user computing is going to cause an upheaval in business technology on a par with the

chaos that surrounded the advent of IBM's System/370. "I watched a whole generation get sliced up in the early '70s," he recalled, and CIOs who have not learned from that experience "are going to get creamed."

"I have not been an iconoclast or a contrarian by design," Rogow protested. Rather, he suggested, his views were formed out of his experiences as a consultant. "Starting in around 1972, I was put in a series of jobs where there was a conventional wisdom, and I was exposed to a series of clients who were in situations

"I watched a whole generation get sliced up in the early '70s," said Rogow, who believes that CIOs who have not learned from that experience "are going to get creamed. . . . Ninety percent of [the IS executives in 1972] were removed by 1975. They couldn't deal with the complexity."

where the conventional wisdom didn't work."

In 1973, as an employee at IBM, Rogow was attempting to acclimate customers to the System/370 series of mainframes. "Now, this is at a point when the conventional wisdom was that you ought to be selling database and data communications, and putting in the early competitive systems. Customer executive training at IBM was presenting 'Data As a Corporate Asset' and all these wonderful things. But that was missing the real problem. You get down to, 'Will it work?' and the answer was, 'No.' The problem was [that] the complexity [of the 370] overwhelmed the system-management process.

"The clients had virtually none of the fundamentals. They didn't have what we think of as essential today: problem recording, problem management, change control, charts of accounts, accounting systems and general ledgers for their own IS. They didn't have anything like a chargeout system that worked."

The trauma involved in adjusting to the 370 environment was extreme. According to Rogow, "Ninety percent of [IS executives in 1972] were removed by 1975. They couldn't deal with the complexity."

So, while conventional wisdom was touting the sky as the limit for the 370, Rogow was getting down and dirty with the next generation of IS management, developing an infrastructure to get them off the ground.

In 1977 he joined the consulting firm of Nolan Norton & Co., in Lexington, Mass., which is now a division of Peat Marwick Main & Co. "I had almost identically the same clients [as those that had been] on the leading edge at IBM," he recalled.

"Now they wanted to know how their use of IT compared with that of

their competitors." So in 1977 to 1981-'82 I was focusing on how [to] measure things like user satisfaction, quality of systems, cost per transaction—how does it compare?"

The conventional wisdom began to recognize the importance of those issues at about the time he had finished with them, Rogow said. He had moved on to discussions about the competitive use of information technology and the need for a new kind of "computer functional executive" for the '80s.

"Now, this is crucial," he said, "Part of the early '80s message was [that] you have to move from just being a technology person to being more business-oriented. Dick Nolan and I sketched [this] out in 1980-'81.

"So I hear some dingbat calling me

Information Is Power . . . Or Is It?

No. It's not exactly chopped liver, but you need to know what to do with it, and have the clout to turn knowledge into action

Part of our fascination with the chief information officer in this Information Age can be attributed to the conventional wisdom, bred into most of us, that information is power. Well, it ain't necessarily so, says Bruce J. Rogow, executive vice president for worldwide analytic resources at the Gartner Group, an IT research firm in Stamford, Conn.

Information is . . . information. Power is something else again. "Transactions for productivity relate to power," Rogow said. "If I can make your business unit more productive or . . . automate it and make it more responsive or . . . do transactions for you, that's the power base that I have built. If I provide you with information, I have no warm, comfy feeling that that therefore has value to you. I don't think the major problem in American industry today is not having enough information. It's not having the leadership and the empowerment to do something.

"We make the assumption that if I tell [an executive] there's a problem, the executive's going to be creative; he or she is going to know what to do. It's this faith we have in Mama and Papa—that they're going to know what to do. And I've seen companies where the people didn't know what to do. To be honest with you, I think most line executives would tell you they get boggled. They just don't know what to do about it.

"It's very naive for us in the information industry to assume that because we produce data, that's going to solve the problem. The Bible's been around for 2,000 years [and it hasn't] been implemented yet."

—K. Melymuka

"There are times you don't want to link your computing and business strategy. . . . In most companies today, the shareholder values and the business strategies aren't aligned, and that's a very crucial thing. You've got to align those [first], and then you can align the IS."

up in 1989 saying, 'Don't you think the IS executive has to. . . .' I sit there and say, 'Who is this person, Rip Van Winkle?'"

In Rogow's view, the conventional wisdom can be maddeningly trite. "There's a set of lemmings at the universities and in the consulting community," he said. "They grab hold of an issue, they commercialize [it], the client base follows, and it becomes a self-fulfilling prophecy."

This can snowball into something dangerous. "The lemming approach causes a mentality of one-upsman-ship," Rogow explained. "So it's like, 'I'm going to be more business-oriented than you are. Not only am I going to be more business-oriented; I'm going to ignore technology.' I had some CIO tell me that he is so much of a CIO and not an IS person that he doesn't even own a TV; that qualifies him. So I said, 'Well, whoopie-do for you.'"

Therein lies the evolution of an iconoclast.

In 1987, about the time Rogow moved to the Gartner Group, the IT plot thickened. But to appreciate the

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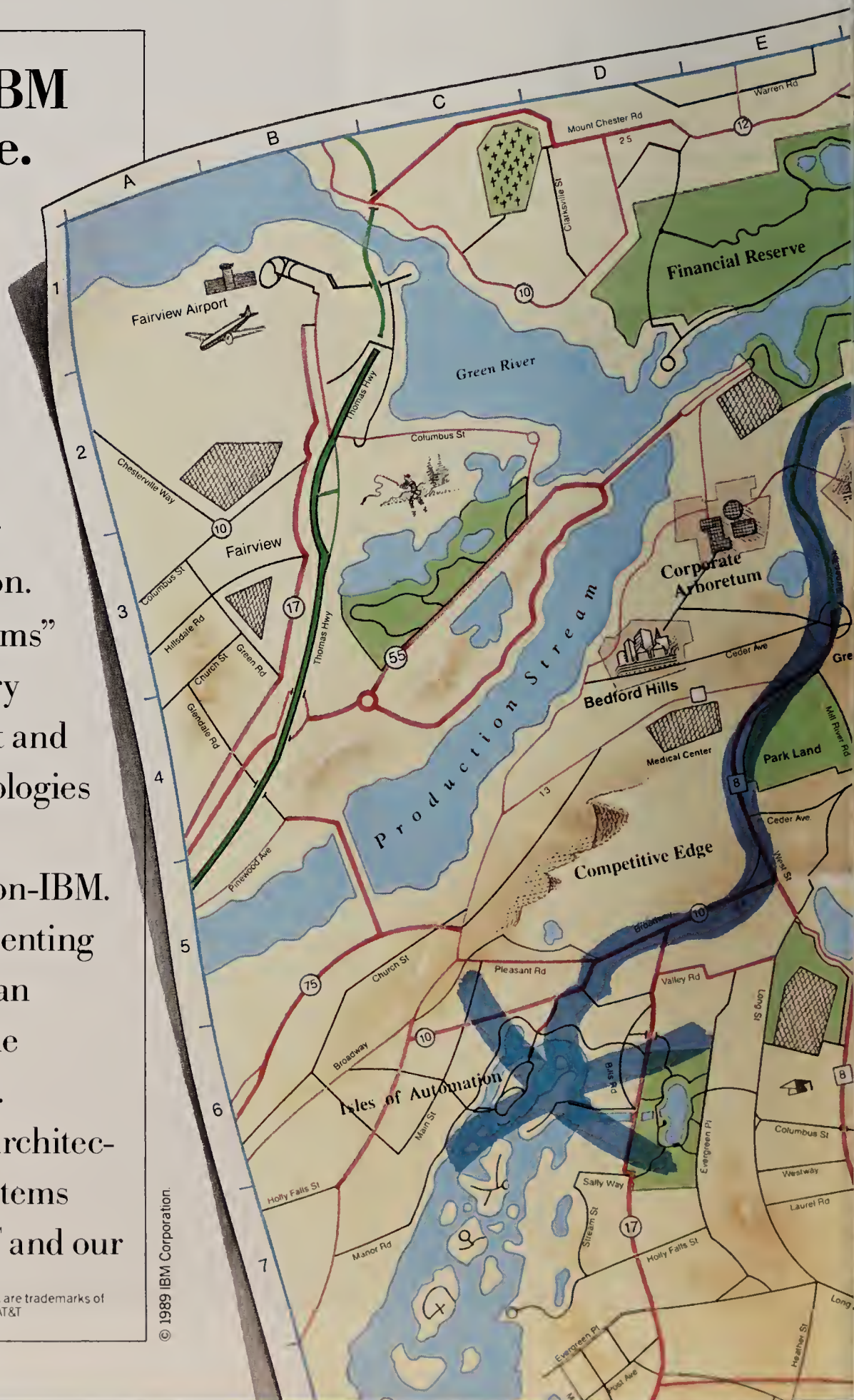
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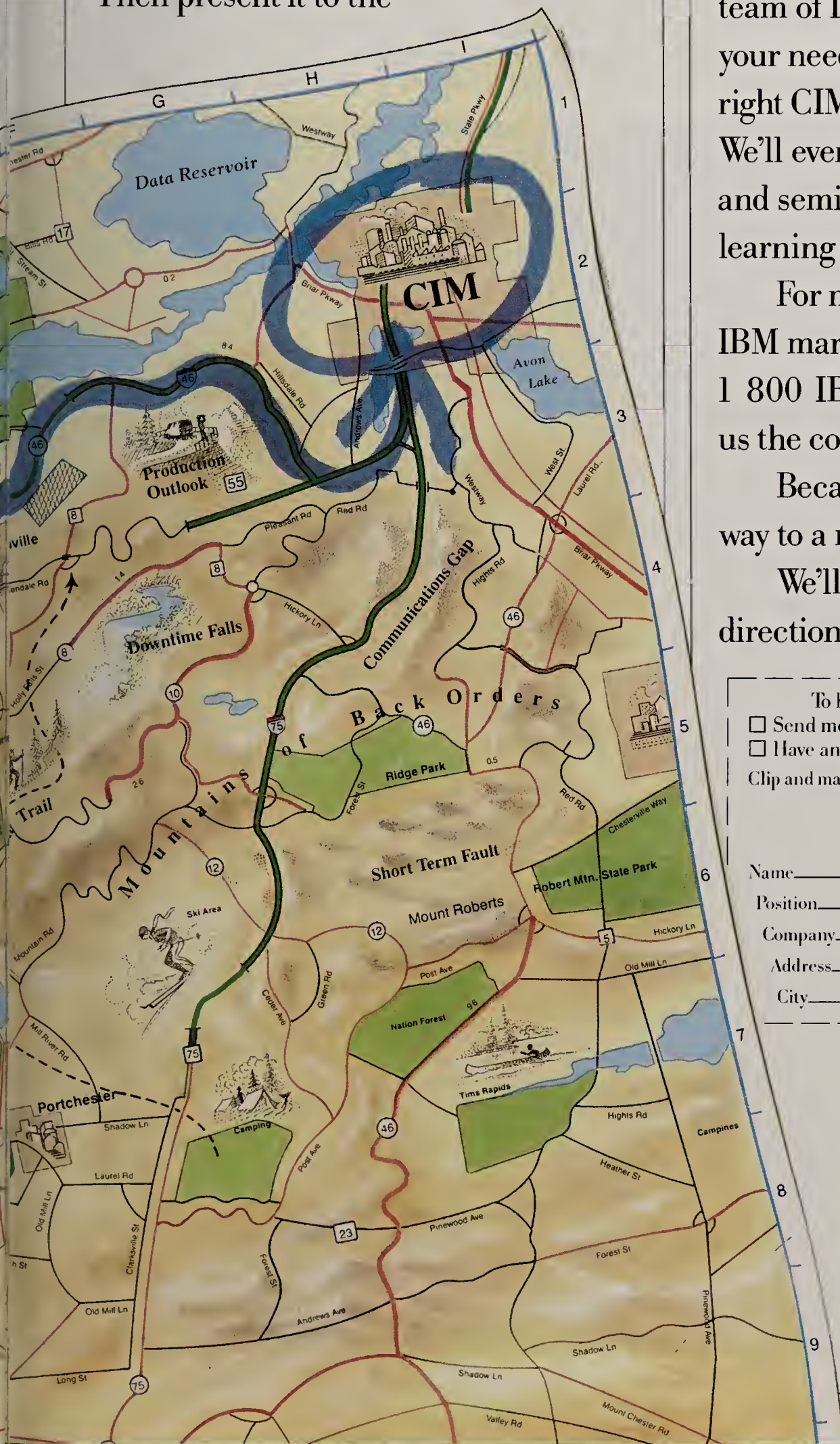
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"I have not been an iconoclast or a contrarian by design. [But,] starting in around 1972, I was put in a series of jobs where there was a conventional wisdom, and I was exposed to a series of clients who were in situations where the conventional wisdom didn't work."

problems, he said, you have to remember the early '70s. "In the early days [of 370 architecture], we didn't know what it was, we didn't know what the systems would be, we didn't know how to manage them."

Since then, he said, the IT environment has been evolving but relatively stable: System/370 architecture, hierarchical databases, and networks under SNA. "That platform has been constant, with a few exceptions—VAX from Digital [Equipment Corp.] and maybe to some degree the PC."

The stability of technology, in fact, has allowed for the rise of the business-oriented CIO—a CIO who is woefully unaware of the demands that could be made upon him or her. "When you're the CIO, and you were put in place in 1981 or '82 or '85 or

'88, there's a lot of history there you may not know . . . and you've had a relatively stable [IT] platform that's understood by people. You don't have the problems anymore of 'I can't make the system work' or 'The network won't stay up' or 'The vendor lied to me.' We don't hear those kinds of complaints anymore. So, that lets the CIO focus on the business side."

On the other hand, Rogow continued, "the business platform has undergone a lot of change. You've seen massive change in the Fortune 500: reindustrialization, demassification, all these new terms. Every company out there is saying, 'We have to reinvent ourselves,' and then all the CIOs come running over to the business side saying, 'Oh my gosh, we have to get involved and understand that.' And they're absolutely right that that requires attention. But while they focus their noses down on the business side, there is about to be a major revolution [on the technology side] unlike [anything] we've seen in 20 years."

Beginning in about 1987, Rogow said, vendors, without the knowledge or understanding of senior IT management, decided to make "a very significant change in the technology platform. The last time this sucker changed was 1970-'71. Now the vendors are coming along and saying, 'This dog [the old technology platform] won't hunt,'" and planning a totally new platform by about 1992. "That new platform is going to have a devastating effect on the existing architecture, so therefore all the rules, all the paradigms, everything you think about in terms of IT is going to change."

"The current architecture is mainframe, with terminals stuck on the end or a PC kind of stuck in as an afterthought; but [PCs are] not a part of the master architecture. The master architecture is mainframe, glass house, big database."

"The new architecture starts with the client interface and works backward into a client-server environment. Now, that's the way people want to run their businesses. From a

technological standpoint, if you want to demassify and push the autonomy down, and you want decision-making within the units, today's technology architectures don't accommodate that. They're not built for massive amounts of peer-to-peer communication. Where you're going in the future requires a client-server, as opposed to a hierarchical, type of

A Survival Six-Pack

When the wave of technology change washes over the IS world, CIOs will do well to have thought some things through

To survive the move to a new IT platform, CIOs have to tackle at least six new issues. So says Bruce J. Rogow, executive vice president for worldwide analytic resources at the Gartner Group, an IT research firm in Stamford, Conn.

■ "They have to recognize that what's coming isn't like what they've seen," Rogow said. "They can't manage by looking at the wake of the ship anymore. Just turning around [to look ahead] is the first issue."

■ CIOs have got to understand the "technomics" of the new age, according to Rogow. "They've got to realize that this is going to mean a profoundly different set of application capabilities and different economic break-even points. What does it cost to put a unit of functionality in place? I have to be able to relate that back to the kinds of applications the company is looking for, and I've got to make decisions on whether I invest now or a year or two from now."

environment; so that platform has to change."

PC networks will meet the needs of new business architectures, but the lack of management processes and 20 years of hardware and software baggage present the same kinds of problems that confounded technicians a generation ago. "When I turn on my desktop computer, it doesn't

automatically back up; it doesn't automatically check for integrity," Rogow said. "If I update something on mine, it doesn't update somewhere else. And the current operating systems and the current architectures and protocols and programming languages don't lend themselves to [the evolving] environment."

The prognosis: massive retooling

from the vendor down. "The vendors, be it IBM, DEC, [Hewlett-Packard]—you name it—all have to go back in now and gut their existing architectures to some degree. Flip the thing over from being glass house down to being end-user, peer-to-peer up and to the side."

To have a hope of dealing with all this, CIOs will need to combine the

■ "The CIO [has to] ensure that what he or she is doing isn't building a Maginot Line in terms of applications—[it has to be] a set of applications based not on the last war but the next war."

■ The CIO has to "recognize that the existing infrastructure for IS won't support the next platform. It's going to be different. And if you try to install the next generation of any of the forms of technology on the existing base of management systems, they'll collapse."

For example, he said, one of the features of IBM's next generation is systems-managed storage, where the systems decide where the data is best placed for service, economics and storage efficiency. "... Tell me how the existing chargeout system works ... in a world of systems-managed storage?" Current chargeout practices track "who stores how much data where." With systems-managed storage, "the user no longer does that."

Thus, said Rogow, "the existing tool sets, the management structures, the planning mechanisms—all that stuff is going to have to change." But changing is easier said than done. "Less than one percent of our clients have people who've ... been trained or [who are] experienced in designing client-server workstation-based systems. That's going to [require] a massive retraining. It's like what we had in the '70s [see main story]."

■ The next issue is competitive advantage in the 1990s. "I don't believe anybody will gain an advantage by doing what Mrs. Fields is doing—or American Airlines, Ameri-

can Hospital Supply, Otis Elevator. Nobody's going to get an advantage out of that, because it's a commodity. Anybody can reproduce it. Today, that's just the cost of doing business. ... So right now, all of this stuff about competitive systems, for the most part, is basically just staying in business."

"How come the only people who don't talk about what they're doing strategically with computers are the ones who have strategic advantage? They don't want anybody to know what they're doing. It's highly unlikely that [anyone will gain an advantage] by using the conventional technology. They're going to gain an advantage by being one of the first to grab something out of the [new technology] area and being the first in their industry to do something somebody else either doesn't recognize is possible or finds almost impossible to replicate."

■ The final issue: How do you get from here to there? "How do I migrate my resources, my people, my management-control [and] planning processes to this new set of paradigms and rules? How do we get from where we are today to where we're going without absolutely screwing us up?"

To deal with these issues requires the support of a technically savvy and visionary CEO, according to the conventional wisdom. Guess who disagrees.

"In the past, it's been very hard to do these kinds of things unless you [had] a visionary CEO, because they were massive top-down types of efforts to use computers strategically. By definition, the next gen-

eration is going to ignore the CEO. It's going to be a very insidious process. The brain drain of the power structure in the next generation of technology starts from the bottom and works up. And that's simply saying that people in [various] aspects of the business will begin to re-automate that part of the business—restructure it from the bottom up."

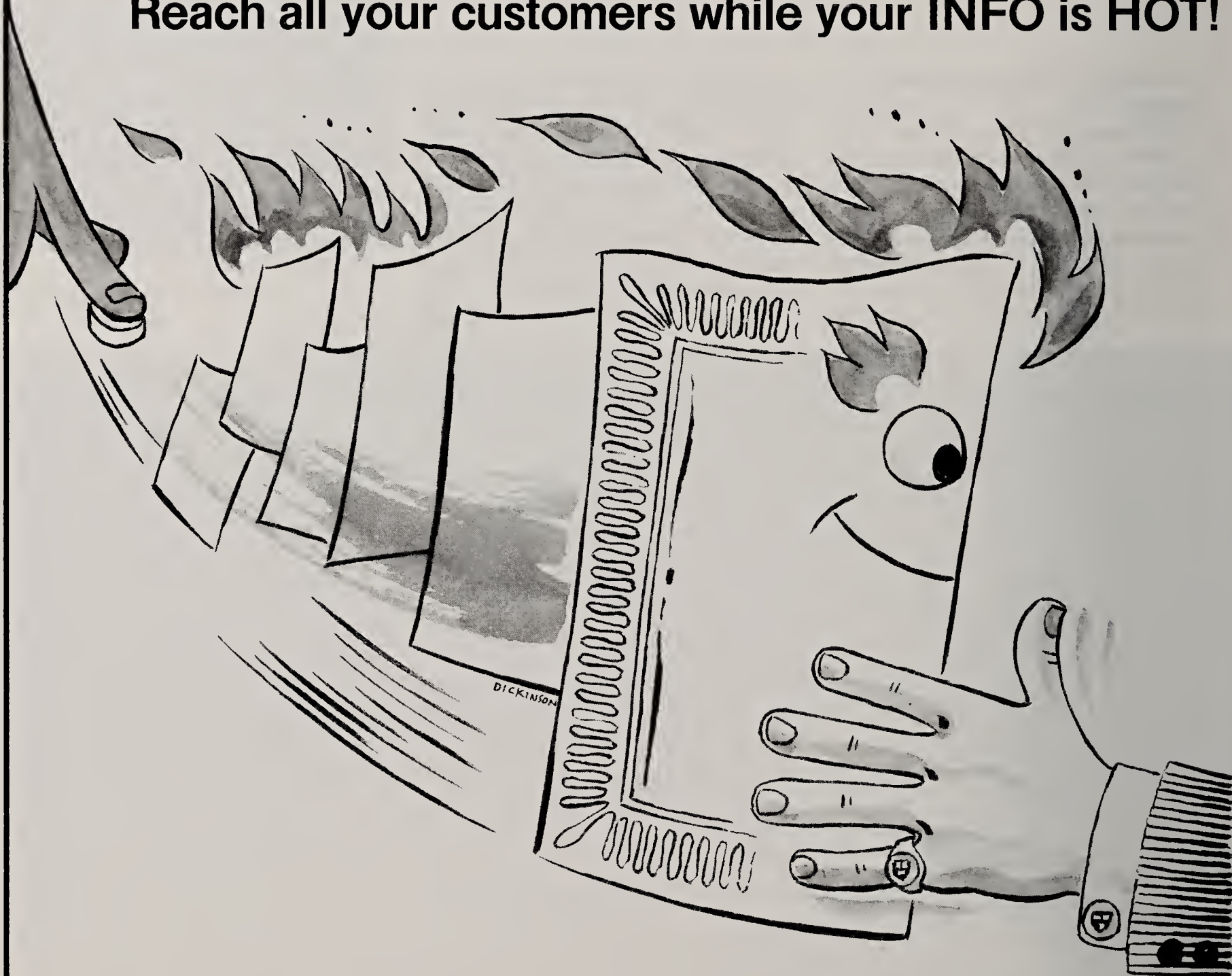
"The whole thing we've been saying in the last five years in management has been, 'Empower your organization; demanage it,' and they have. If you empower your organization, you give very bright people some leeway and tools, and those people will solve the problems."

And if your organization isn't sufficiently flattened to allow the bright people to solve the problems, Rogow believes, technology itself will take care of it. "I will bet on technology forcing organizational change two-to-one over a CEO screaming and yelling about organizational change. I really believe the technology forces the change. I don't know how many executives beginning in the 1980s told me they were going to transform their business ... to be a paperless society and all this stuff. I'm still trying to find those people. But I can remember an equal number [of CEOs] ... who stood up in 1981 and '82 and '83 and said, 'You'll see PCs in my company over my dead body.' Now, which happened? Technology that's cheap enough and alluring enough, and has value, will come to the organization whether the CEO wants it or not."

—K. Melymuka

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business savvy of Peter Drucker with the technical virtuosity of Thomas Edison. Where are these guys? "There are a few," Rogow said, but for the most part, "they're not out there. But we didn't have a Columbus until Columbus came along."

"My problem with the Tinkerbell School of CIOs is that they're all over here saying, 'It's all a business issue, and I've got my technology dweebs worrying about the IT side because nothing strategic happens there,' and that's fine as long as it's a linear event. But when you start talking about a massive shift, these Tinkerbell types—fitting from one user group to another, telling them computers are strategic and we ought to have this study and that study—they are going to get creamed as this [shift] begins to happen."

And, according to Rogow, the tech troops aren't going to rescue a CIO from the business side. "The people below are still [annoyed] that one of their people didn't get to be the CIO. They're not going to say, 'Oh, by the way, your pants are down.' They're going to say, 'Oh, you're doing great. Why don't you lean over the side of the boat and hold the anchor?'"

To survive the next decade, Rogow said, CIOs will have to re-emphasize technology. "That isn't to say they should ignore the business side; it's just to say the pendulum has to swing back."

"I probably wouldn't be as adamant about it, but I've been through this before," Rogow stressed. "I look at it as Bellow Woods, the Argonne. To me, it looks like trench warfare: people getting wiped out. And I really believe [that] in the next three years a lot of these people—the Tinkerbell types—they're going to lose it because they don't understand that there is a different paradigm. . . . They don't understand the paradigm, and they can't relate it to their organization, which to me is their primary purpose."

CIOs are not the only ones who don't know what's going on, Rogow said. He has even less tolerance for consultants of the lemming



"The basic issue is that the kinds of applications that clients want to put in place to enable the new cluster organizations do not economically and efficiently run on the existing technology base, which is predominantly hierarchic."

school than he has for Tinkerbell CIOs. "A 'six-week-wonder' consultant told me there is no case where you wouldn't want to link computing and business strategy."

This is not the kind of statement you want to make to the iconoclast of IT. "There *are* times you don't want to link your computing and business strategy. Let's assume that you're in an organization that just doesn't have the capability of delivering solid, dependable, high-service-level systems. You have an IS group that's just too weak. But you went ahead and said, 'Let's do what American Airlines did. . . . We're going to link our customers online, 'cause that's what the business strategy says we have to do.' It could turn into the greatest embarrassment you could ever have. So, in that case, it might not be the time to do it. It might be that you've got to build your business strategy around some of your other strengths

and take the next three years to fix your weakness."

That's not the only scenario where such a linkage might not be a wise move, he said. "You might be in a situation where your stock price is below the book value. . . . You're in fear of imminent takeover, and your company's thinking about breaking off pieces and units. Now, within that context, where you've got problems of shareholder value, you might very much re-evaluate whether the business strategy should rely upon technology," especially when such an alignment would require a massive investment.

"In most companies today, the shareholder values and the business strategies aren't aligned, and that's a very crucial thing. You've got to align those [first], and then you can align the IS."

But this is almost beside the point, according to Rogow, because the entire IT platform will change regardless of a company's business strategies. "The basic issue is that the kinds of applications that clients want to put in place to enable the new cluster organizations do not economically and efficiently run on the existing technology base, which is predominantly hierarchic."

Most businesses will have to make do with less than the ideal CIO, but they'll muddle by if they get their perspectives right. "My advice to business execs is: It's time to stop listening to all the homilies of how computers are strategic and start using your brains," Rogow said. "You can see [by] all the handwriting on the wall that there's a lot going on out there."

The debate over whether a system is strategic or not could become purely academic in the near future, he warned. "If [CIOs don't] recognize that they've got to get their heads back into technology—and that's not just the once-a-year pitch from the vendor—they're not going to see what hit them." 

Kathleen Melymuka is a freelance writer based in Duxbury, Mass. She is a frequent contributor to CIO.



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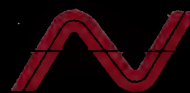
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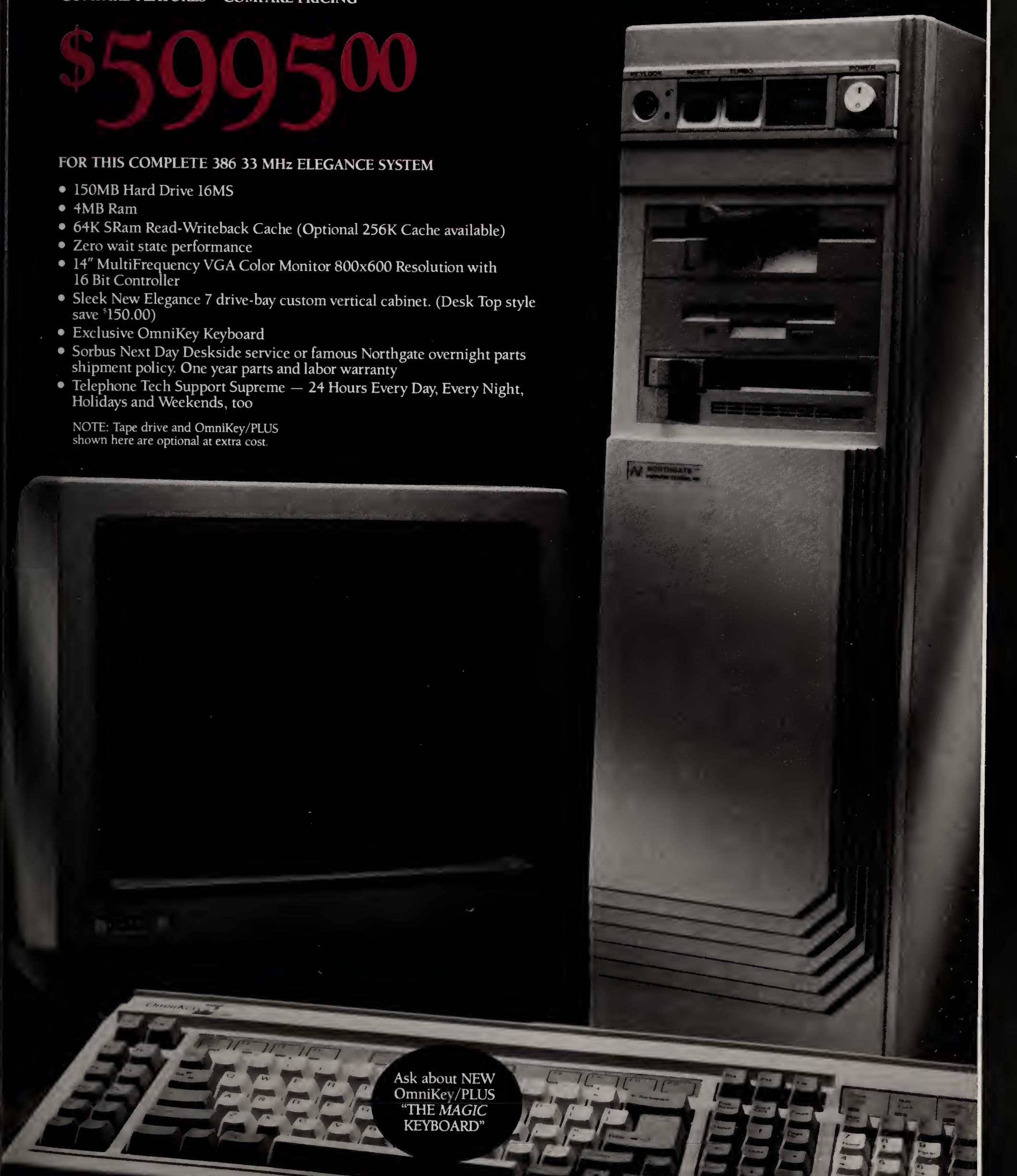
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T

he honeymoon is over. User-friendliness was OK as far as it went, but it's become clear that any deeper, more rewarding and enduring user-computer relationship has to be based on more than just a pretty interface.

What's missing from the user-computer relationship is an interface that can truly be taken for granted

As the initial infatuation with cute icons, pull-down menus and graphics-rich VDT screens wanes, the need to go beyond those first efforts be-

ing consumer-industrial products for a growing class of users. We have to stop thinking 'systems' and start thinking 'product,' and we have to incorporate the same kinds of ease-of-use considerations that go into the design of a General Electric refrigerator. We have to start thinking about the interface and its ease-of-use in a wider sense.

"When I used to develop decision-support systems, I reckoned that 60 percent of the code went not to functionality, but to making the system easy to use," said Keen. "What that means is you would probably double

EASY STREET

comes increasingly apparent—as does the need for CIOs to encourage programmers to develop a deeper understanding of and involvement in the design of the user-computer interface.

"To the user, the interface is the system, and the interface has become far more crucial because we have come to rely on information systems to so much greater an extent," said Peter Keen, executive director of the Washington-based International Center for Information Technology and a visiting professor at Fordham University.

According to Keen, any CIO who hopes to successfully integrate his information systems into his company's operations has to get his programmers to recognize that in designing new systems, "they are no longer developing software; they are develop-

the cost of development in order to make your systems easy to use."

This recognition of the growing importance of the interface manifests itself in a number of ways. For one, an increasing number of firms are deciding that the user-computer interaction cannot be treated as a last-minute add-on—a set of superficial features to be added after the "real" systems design has been completed.

"As the user interface becomes more complex and a more important part of the overall application, user considerations are being introduced earlier in the development process," said Stan Caplan, supervisor of human factors at Eastman Kodak Co. in Rochester, N.Y. "You can't just throw it in at the end. You have to think about it earlier, plan for it and design it."

Consider the new approach that

BY B.G. YOVOVICH



ELIZABETH REGAN: *addressing a whole new set of issues related to user interfaces and screen standards*

the Massachusetts Mutual Life Insurance Co. in Springfield, Mass., is taking in the development of its Horizon system, a multi-year, multi-million dollar rewrite of the computer programs that support the insurance company's main line of business.

"On the Horizon project, we have established a user interface and training team, the first time that we have ever done this at MassMutual," said Elizabeth A. Regan, a consultant in the systems-development division at

MassMutual and project manager of the Horizon user interface and training team. The kind of attention that MassMutual is paying to the user interface and how they are designing the computer systems is fairly new. "It's something that has evolved over the last six months," said Regan, "and it reflects a recognition of the importance of the user interface. It represents one of the big changes in the way that we design computer systems within the company."

MassMutual's decision to change its approach arose when the insurance firm expanded the IS capabilities available to its field force. This expansion caused "a number of seemingly unrelated user-interface issues to arise," said Regan. For one thing, when MassMutual introduced PC workstations, the people out in the field who already had been accustomed to using the company's main-frame systems had little difficulty adjusting, but new hires were having

PHOTO BY FRANK POOLE

trouble and getting confused. It turned out that having to learn both the PC and mainframe environments at the same time added a level of complexity—a situation that suggested the need to develop a simpler, consistent interface.

MassMutual was also then in the midst of a field-office automation project that represented one of the firm's first uses of color terminals—which resulted in a sudden hodgepodge of interface designs. "Developers began doing all sorts of things with color," recalled Regan, "and it was amazing, the melee of different [interfaces] that we were getting in a short time. The tendency was to overuse color, and we quickly decided that we didn't want every programmer to go off in his own direction. We didn't want to use color just for pizzazz; we wanted to use it to make our systems more usable."

MassMutual established its own color standards. For example, one hue is used for all the basic field labels and instructions, another for display fields that are protected from user modification, and a third for entry fields. Similarly, standards for color-coding of messages have been established. Red indicates a critical message that must be addressed before the user can move forward. Yellow indicates a warning message that is important, but which a user can choose to deal with later. Messages in white are informational, for example: "Your requested change has been made."

"These kinds of things were among our first steps," said Regan. Since then, she added, "we have broadened out to address the whole set of issues connected with screen standards and user interfaces."

MassMutual has not been alone in devoting more attention and resources to the development of user interfaces. Its effort represents a new wave of similar attempts to develop better in-

"Every systems development project should have one person who is responsible for the user interface so that there is a center of responsibility."

—Ben Shneiderman

terfaces and to improve user-computer interactions. The most obvious steps have been the growing efforts to replace character-based interfaces with graphics-oriented displays, and the greater attention being paid to the visual design of the display interfaces. Some companies are following the advice of University of Maryland computer sciences professor Ben Shneiderman, who also directs UM's Human-Computer Interaction Lab. Shneiderman believes the interface warrants special enough attention to require a sponsor. "Every systems-development project should have one person who is responsible for the

user interface," said Shneiderman, "so that there is a center of responsibility."

Another strategy for assuring improved interfaces is to codify explicit interface and usability guidelines to help designers create systems that better serve the end users. Aetna Life & Casualty in Hartford, Conn., for example, has an 85-page set of "Software Usability Guidelines" that covers topics such as intuitiveness of operation, interaction styles, response time and display rate, navigation, consistency, user control, screen design, productivity levers, safety features, error handling, documentation, training and testing. Included in the guidelines are such specific tips as the advice to word error messages so that they read "not valid" or "stop" rather than the needlessly alarming "fatal error, run aborted" and "catastrophic error—operator notified"; the caution not to assign critical functions to adjacent keys—for example, having an E-mail system with F6 (format message) and F7 (send message); and more general advice about such things as the use of metaphors that enable users to develop mental models that help them understand the system.



STAN CAPLAN: Plan and design with the user in mind. The interface shouldn't be an afterthought.

Striving To Be 'User-Normal'

Maybe it's time to just forget the term "user-friendly."

"A lot of the talk about user-friendly resulted in very misdirected efforts at getting people to accept computers," recalled Elizabeth A. Re-

gan of Massachusetts Mutual Life Insurance Co. in Springfield, Mass. "We did things like try to personify programs so that communicating with the machine was like having a conversation. Users were greeted by things like, 'Good morning, I am your friendly computer. I am easy to use and I will lead you, step by step, in how to use me.'"

"Rather than doing what it intended, the effort to personify the machine actually reinforced people's fears—that the computer would take over and replace the person."

Today, a variety of new terms have arisen to describe the goal of interface design. "I don't use the term 'user-friendly'; I prefer to use the word 'mundane,'" said Peter Keen, executive director of the International Center for Information Technology in Washington, D.C., and a visiting professor at Fordham University. "Information systems need to be like all the technologies we use in our lives. We have to be able to take them for granted, like

The ingratiating mannerisms of 'user-friendliness' sometimes came off as creepy or annoying. Now the object is to have the interface go virtually unnoticed

we do our cars."

Or, put another way, "systems need to be 'normal-to-use,'" said Fred Schott, senior consultant for People/Technology Services at Aetna Life & Casualty in Hartford, Conn. "They should be designed so that

they allow people to accomplish their work without making the system's presence constantly felt."

Regan of MassMutual described her goal as "transparency." "What we really want is for the computer to be an effective tool to help people get their jobs done," she said. "The tool has to be transparent, the way a pencil is transparent. Imagine if, every time you picked up a pencil, you had to remember how to turn it on and which end to write with. I am hoping that, if we do our job with the interface, we will be able to use the computer just as mindlessly and effortlessly as we pick up a pencil and start writing."

Added Rick Eder, information technology coordinator at Eastman Kodak Co. in Rochester, N.Y., "You want the interface to be intuitive, to make it possible for users to stop thinking, 'What was that command?' and start thinking, 'How can I better perform my tasks using the computer?'"

—B.G. Yovovich

"Three years ago, we were trying to build [systems designers'] awareness of the importance of the basic principles," said Fred Schott, senior consultant for People/Technology Services at Aetna Life & Casualty. "We now are at a point where people have bought into the idea and are trying to understand how to do it. For example, people now subscribe to the theory that you should provide

shortcuts for experienced users. . . . What [programmers] are looking for [in the guidelines] are specific examples of how they might do that." As a result, the guidelines have been expanded to provide not only specific examples and recommendations, but also discussion of the relative advantages and disadvantages of different interface options.

Another indication of the changing

attitudes toward user interfaces is the increasing number of companies—hardware and software suppliers such as Apple Computer Inc., IBM Corp. and Digital Equipment Corp., as well as user organizations such as IDS Financial Services, Holiday Corp., Aetna, and Eastman Kodak—that are creating usability labs in which system prototypes can be tested and potential user/computer problems can be ironed out.

"We have to stop thinking 'systems' and start thinking 'product,' and we have to incorporate the same kinds of ease-of-use considerations that go into the design of a General Electric refrigerator."

—Peter Keen

"Developers need to understand not only who the users are and what tasks they perform," said Schott, "but also where and how often the users perform those tasks, how they learn to do them, and what they do when things go wrong." A usability lab enables "user-interface development to proceed from the outside in," said Schott. "It involves creating a prototype and continually improving and extending it through user testing."

A number of factors have combined to spur these efforts at improving user-computer interfaces. As computers become more fully integrated into business operations and are applied to an ever-broadening variety of functions, the sheer number of applications now



FRED SCHOTT: *improving interfaces through user testing labs*

available to many users creates new system-design challenges.

"More people are sitting in front of terminals than ever before, and they are using them more and more," said Margrethe Olson, an associate professor at New York University and director of its Center for Research on Information Systems. "We are adding more and more tools, more and more applications, and we've got a greater variety of systems being used by the same person."

As a result, it has become both more important and more difficult to create interfaces that provide easy-to-use access to the growing array of capabilities and applications. "There is always a trade-off between increasing the functionality and maintaining the elegance of the interface," said Charles Kreitzberg, president of Cognetics Corp., in Princeton Junction, N.J. This challenge has confronted Kreitzberg in his work on the development of the next generation of automated teller machines

(ATMs). "We have spent a lot of time thinking about what would happen if we increased the functionality of the ATM three- or fourfold. How could we build a user-interface so that it would still be easy to use?"

"What we have found is that, by building the right kind of graphics—in high-resolution and color—and by being very consistent about it, you can build screens that people can just look at and grasp very quickly. It is possible to design systems that have 'zero-trial learning'—where someone can walk up to it and use it the first time—but it requires tremendous sophistication in the graphics design of the displays," said Kreitzberg. He advises CIOs to keep an eye out for those within their IS operations who have graphic-design skills, and believes that CIOs should likewise place more emphasis on these skills when they evaluate prospective employees.

The same kinds of challenges that arise out of the development of the

"There is always a trade-off between increasing the functionality [of a system] and maintaining the elegance of the interface."

—Charles Kreitzberg

next generation of ATM systems are also likely to face an increasing number of IS operations—especially as expansion of linking technologies such as EDI makes it necessary for CIOs to oversee systems that will be used by non-employees and even, in many cases, by the general public.

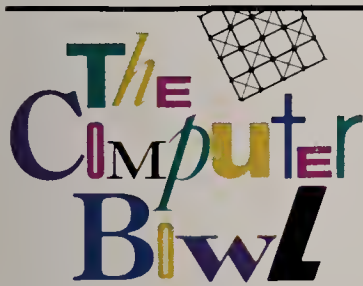
Aetna's Employee Benefits Division now offers its clients computer-equipped public-access kiosks that the clients' employees can use to get information about their benefits plans. Obviously, the employees using the kiosks may represent a wide range of computer experience. "CIOs will need to remember, more than they had in the past, that there will be a lot of different people who will be using their information systems," said Caplan of Eastman Kodak.



CHARLES KREITZBERG: *Graphic design is key.*

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As CIOs oversee the design of new user-computer interfaces that can accommodate the explosive growth in the number of unschooled users, they must also remind systems designers of the growing population of users who have become more sophisticated in their use of information systems.

Take the simple matter of the display of information. "Five years ago,

"Efforts to build ease-of-use into systems often degenerate into targeting the lowest common denominator and result in features that may be easy for unskilled users but hinder more experienced or more knowledgeable users."

—Fred Schott

an application very likely would have been hard-copy and batch-oriented—printed reports rather than on-line," said Nancy Goodwin, who chairs the Computer Systems Technical Group of the Human Factors Society, a non-profit organization based in Santa Monica, Calif. "Today," she said, "[an application] would be more display-oriented and interactive, and it would be more graphically oriented versus data tables. People come in all the time saying, 'My kid is playing Nintendo, and it is doing all these things. Why can't my computer do this?' They expect to see neat graphics and to be able to manipulate them."

On the other hand, as users become more experienced, they are of-

Software as Metaphor

In the world of the user-computer interface, familiarity breeds anything but contempt

The secret to a good interface," said Stan Caplan, supervisor of human factors at Eastman Kodak Co. in Rochester, N.Y., "is to have something that maps to something that the users already know."

Or, as Harry Hersh, a consulting engineer at Digital Equipment Corp. in Nashua, N.H., puts it: "Users naturally try to apply the knowledge that they already have, and people have a whole lot of knowledge about the physical world that they bring to the interaction."

If an interface is designed so that the user's prior experience can act as a guide to using the system—as is the case, for example, in the very popular Macintosh desktop metaphor—then "people will think it is

easy to use, that it is natural, convenient," said Hersh. "In fact, they won't even pay attention to it. They will start paying attention to the problem that they are trying to solve, not to the computer—and that is really the goal."

For instance, the easily understood metaphor underlying Lotus spreadsheets is generally credited for the software's rapid acceptance. "What made spreadsheets different was that they gave you this matrix of cells, rows and columns, plus a cursor that you could use to travel around the matrix to see and work different parts," said Lotus's founder Mitchell Kapor, who has since left Lotus and founded ON Technology Inc., a software company dedicated to making computer systems easier



MITCHELL KAPOR

to design and use based in Cambridge, Mass. A spreadsheet was like paper, only better," he said. "It was magical paper—and people are familiar with paper and know how to operate with it. That is very im-

ten annoyed by features that they formerly adored, and depended upon, as novices.

"Efforts to build ease-of-use into systems often degenerate into targeting the lowest common denominator and result in features that may be easy for unskilled users but hinder more experienced or more knowledgeable users," said Aetna's Schott. As a result, the Aetna usability guidelines emphasize that systems "should have helping features for those who are just starting out, but also should have short-cuts for experienced users. As users become more proficient, for instance, they should be able to go to keyboard equivalents rather than have to use menus."

According to Susan Dray, director of People/Technology Services at Minneapolis-based IDS Financial Services, systems designers' perception

of users has expanded to include their potential to evolve. "In the past, we tended to think of two poles of users. There were the 'naive' or 'dumb' users—people who would never progress beyond a low level of usage. Then there were the expert users. You used to design for either the techies or the clericals. Now there is a middle ground, and you have to take into consideration what kind of users people are likely to become."

To some extent, technology is helping systems designers meet the new challenges connected with interfaces. Tool kits that support the process of creating user interfaces, for instance, make it much easier to do iterative testing and refinement of prototype versions.

Also helpful, said Harry Hersh, a consulting engineer at Digital Equipment Corp. in Nashua, N.H., are "the increasing technical capabili-

Experience taught Kapor the importance of good metaphoric underpinnings. "I have come to the conclusion that Lotus Agenda, the last product I did for Lotus, was hard to learn because it is so unfamiliar," he said. "It didn't have any antecedents; it has its own set of rules and ways to do things, and it is not based on a physicalistic metaphor. People typically report spending 30 to 40 hours or more to master the product, but that once they have done that, it . . . changes the way they organize their personal information."

"I now see that it could really be improved if it were easier to learn to use. Were I still at Lotus, I would be thinking about how you could change the presentation of the information—not the underlying structure—but how it is organized on the screen."

Because of Agenda, said Kapor, "[at ON Technology] we try to think through the products we are building and ask ourselves if they will be familiar [to users]. We try to think what sort of real-world thing is a product like. We try to leverage off of people's experience and to figure out how can we use the magic of the computer to make it better."

—B.G. Yovovich

ties—things like being able to have a million pixels on a screen rather than just 640-by-480—that have made it possible to create much more sophisticated and effective interfaces. In fact, argued Hersh, who is also co-author of *The Human Factor: Designing Computer Systems for People*, these new technical capabilities will help CIOs convince their systems designers to reverse some long-held design principles, including their traditional efforts to create streamlined systems that strive to avoid redundancy—which turns out not to be such a bad thing in interface design. "Anything we can do to provide redundant information will make for a better, more robust interface," he said.

He illustrated the need for redundancy by citing efforts to create synthetic speech. "One of the differences between synthetic speech and natural speech is the greater amount of redundancy that there is in the natural speech signal. If you look at the natural speech spectrum, you can take either the top half of frequencies or the bottom half of frequencies and throw them out, and you can still understand what the person is saying." But the lack of signal redundancy in



HARRY HERSH: a bottom-line issue.

synthesized speech means that, "even with very good signals, you have to pay more attention when you listen to it. It is more draining because if you miss one bit of information you are lost."

Hersh contends that the same principle applies to the design of interfaces. "I saw a version of the Macintosh Finder at Apple. . . . As you did things, [the system made] appropriate sounds. When you dragged a window across the screen, you got kind of a scraping noise. When you pushed a button, you got another kind of sound. That type of thing adds richness to the interface and makes it more forgiving of lapses of attention."

"We can be purists and be analytical and try to get everything to the purest essence," Hersh continued, "but that makes things very difficult. It means that you have to pay full attention to every individual thing. . . . That attitude needs to be cautioned against."

Hersh's arguments might not yet reflect the IS mainstream view, but it seems as though things are heading that way—and for the most elementary of business reasons. "Management is recognizing that the [interface-]design issues are not niceties," said Kreitzberg, "but that they impact on the bottom line." ☐

B.G. Yovovich is a freelance writer based in Evanston, Ill.



SUSAN DRAY: creating systems for the increasing sophistication of the user

PHOTO LEFT BY TOM PERRY/PHOTO TOP BY BILL TRUSLOW

E-Mail Bonding

An electronic-mail population explosion is being fueled by the increasing variety of business applications

BY MICHAEL F. CAVANAGH

After a decade of development and maturation, electronic mail has evolved beyond its humble, though at the time revolutionary, beginnings as a mere messaging medium. In the 1990s, E-mail will significantly change the nature of communications and the way that people all over the country work, enhancing simple person-to-person communications and enabling project teams to call upon the expertise of colleagues from Toledo to Tokyo to Torremolinos, without regard for "time-zone windows" or meeting conflicts.

Perhaps even more important, a variety of useful tasks can be accomplished with E-mail regardless of the user's location. Widgets necessary for a project's completion can be ordered and paid for in an efficient and timely manner. Experts on the penguins that live at the southernmost tip of Chile can have the text of all articles mentioning these aquatic birds delivered to their E-mailboxes.

Only vi-

sionaries can imagine the technology's full potential, in the same way that perhaps only the visionaries of the 1970s fully grasped the potential of the personal computer. Indeed, PC visionary Steven Jobs has said that the 1990s will be the era of "interpersonal computing."

The role of electronic mail in interpersonal computing is vital. Whether to coordinate project teams at sites around the country, transmit drafts of legal briefs between law offices and clients, or send in sales reports from laptop computers on the road, electronic mail is meeting a range of communications needs that probably weren't given much thought even a few years ago by today's typical users. Almost nine million Americans now use electronic mail regularly—a jump from just 430,000 a decade ago and from about one million in 1984. The aerospace industry estimates that 600,000 of its workers access their electronic mailboxes on a daily basis; Deere & Co. has seen its base of company users jump from 15 in 1984 to about 15,000 today.

Trying to describe the "typical" user company or application for 1990 would be virtually impossible, but we can gain insight into today's industry by examining a few organizations that have implemented messaging.

■ Deere & Co., in Moline, Ill., has automated many aspects of its business using E-mail. The results are telling. For example, sales branches around the country report that the time taken to prepare and deliver a dealer prospectus to a territory manager has dropped from one week to one day since E-mail usage began.

"Electronic mail is now the fastest growing and most widely used system in our company," said Dale Siefker, office project manager at Deere.

Indeed, said Siefker, "the night-



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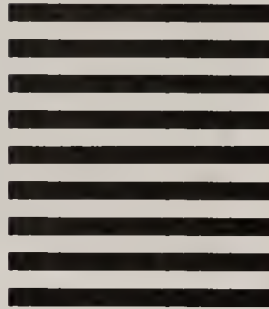
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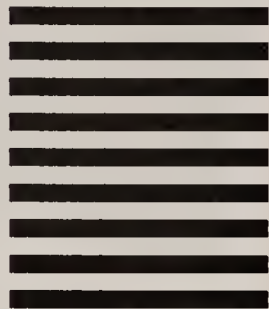
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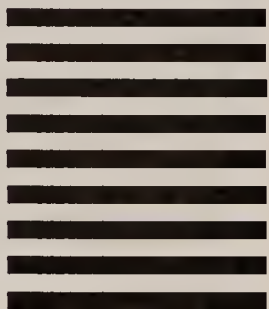
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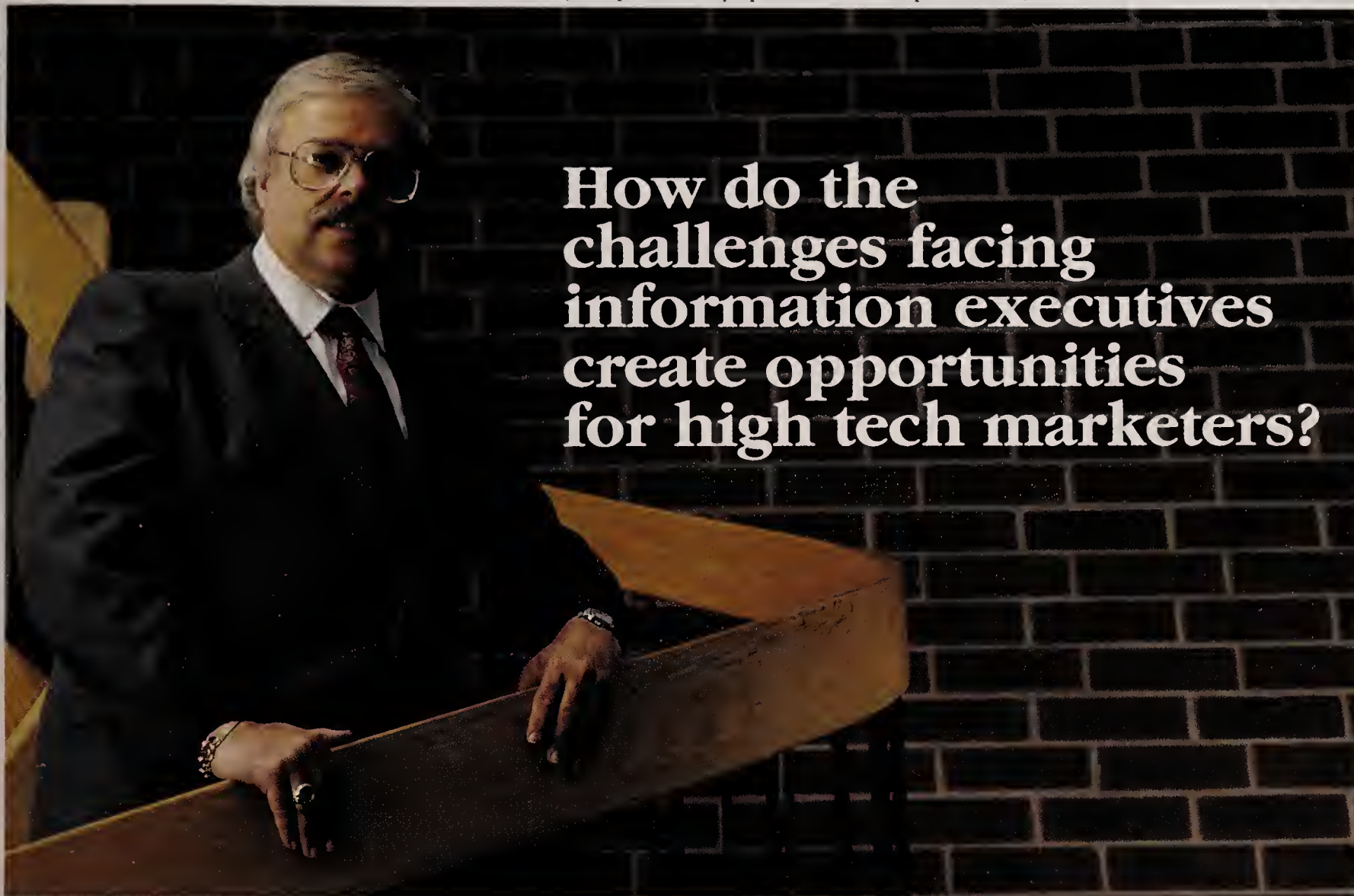
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Answers for the Information Age.

mare of ringing telephones and callbacks has been eliminated since field sales personnel have been given direct access to the information they need" through the use of electronic messaging and information systems.

■ Hughes Aircraft Co., headquartered in Los Angeles, was one of the leaders of the Aerospace Industries Association's X.400 interconnection pilot. Hughes has now begun inter-enterprise messaging in earnest, primarily with other AIA companies working on joint projects. Internally, the technology is used to coordinate work projects and a range of administrative responsibilities. It has become an essential communications tool for 15,000 of the company's employees.

Peter Donaghy, who as manager of customer services and support laboratory is responsible for E-mail and a wide range of related functions at Hughes, said that with the electronic-mail backbone in place, his staff plans to add ambitious applications to the system. A prototype online forms-routing system is already being used by a test group in the company's administration department. Donaghy predicts that there will be massive savings if such activities as payroll authorizations and hiring requests can be automated, and he noted that the success of electronic mail within Hughes since the mid-'80s augured well for this specific project's future.

■ The electronic-mail network at New York's Chase Manhattan Bank currently has only 5,000 users, but an expansion of the system to 30 countries is underway. The goal is to link Chase staff with selected customers and other centers of bank operations throughout the Western Hemisphere, Europe and Asia, according to Steve Mahaney, global electronic messaging support manager at Chase. "We're developing a homogeneous network that provides for the transparent interchange of messages, documents and files between IBM, DEC, Wang, LAN, and third-party systems," said Mahaney.

The most pressing issue for both the corporate E-mail manager and the system or service provider is interconnection, not only within the organization but between organizations

*Almost nine million
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1984.*

as well. Most major corporations have already taken a number of steps toward achieving interconnection and have plans to expand on that in the near future. For example, many corporations with large IBM PROFS and DEC All-in-One communities have enabled individual users to exchange messages and other information across the two systems. Likewise, a great many large organizations have linked up with public E-mail services to enable inter-enterprise communications or simply to permit one user base within the corporation to communicate with another.

While links between distinct internal systems and between public and internal systems have been proliferating for the past four or five years, public-service interconnection is the E-mail development that has garnered recent press attention. Announcements of interconnections such as that between AT&T Mail and MCI Mail make the news. By mid-1990, the grid of public services implementing full commercial interconnections with each other will be very near complete. Announcements seem to come virtually every week, from Dialcom and Sprint Mail, Western Union and AT&T, IBM Information Network and MCI. Less than a year ago there weren't even pilot links between these public services.

At the heart of these commercial announcements is the X.400 international communications standard, developed by the Consultative Committee for International Telephony and Telegraphy (CCITT). X.400 has received international support in record

time. With all aspects of the messaging "highway" system being developed at a wild pace, X.400 guarantees that traffic will flow smoothly from one route to another. It will be the core standard for all segments of future E-mail interconnection.

The growth rates of the late 1980s will, of course, be impossible to maintain throughout the '90s. Still, the beginning of this decade will see hundreds of thousands of new Americans join the ranks of active mailbox users every month, and a major factor in this user explosion will be local-area-network messaging.

LANs were first used largely for sharing files and printers. Over the past year or two, however, LAN messaging has skyrocketed, thanks to easy-to-use, powerful packages produced by a number of vendors.

To be sure, linking these LAN communities into a functional mainframe- or mini-based corporatewide E-mail system has been a challenge, but it's now clear that LAN users are joining these larger messaging communities without serious interconnection difficulties.

The explosion in the use of facsimile machines also has important implications for electronic-mail users. The interrelationship of the two technologies is an interesting one. At first glance, some might classify facsimile as a competing technology, but most electronic-mail analysts view the relationship differently. Certainly, there are instances when a communication is made via fax when it could have been completed by electronic mail, and that could be considered a diversion of business by someone selling E-mail. On the other hand, fax machines are already widening the base of delivery terminals for computer messaging, and future trends suggest an eventual merger of the two technologies.

Most vendors of public electronic-mail services already offer delivery to a fax machine as an option. Many users of internal office-automation systems and LANs also have this computer-to-fax option. More significantly, during the 1990s facsimile may well emerge as the migration device that most Americans use to

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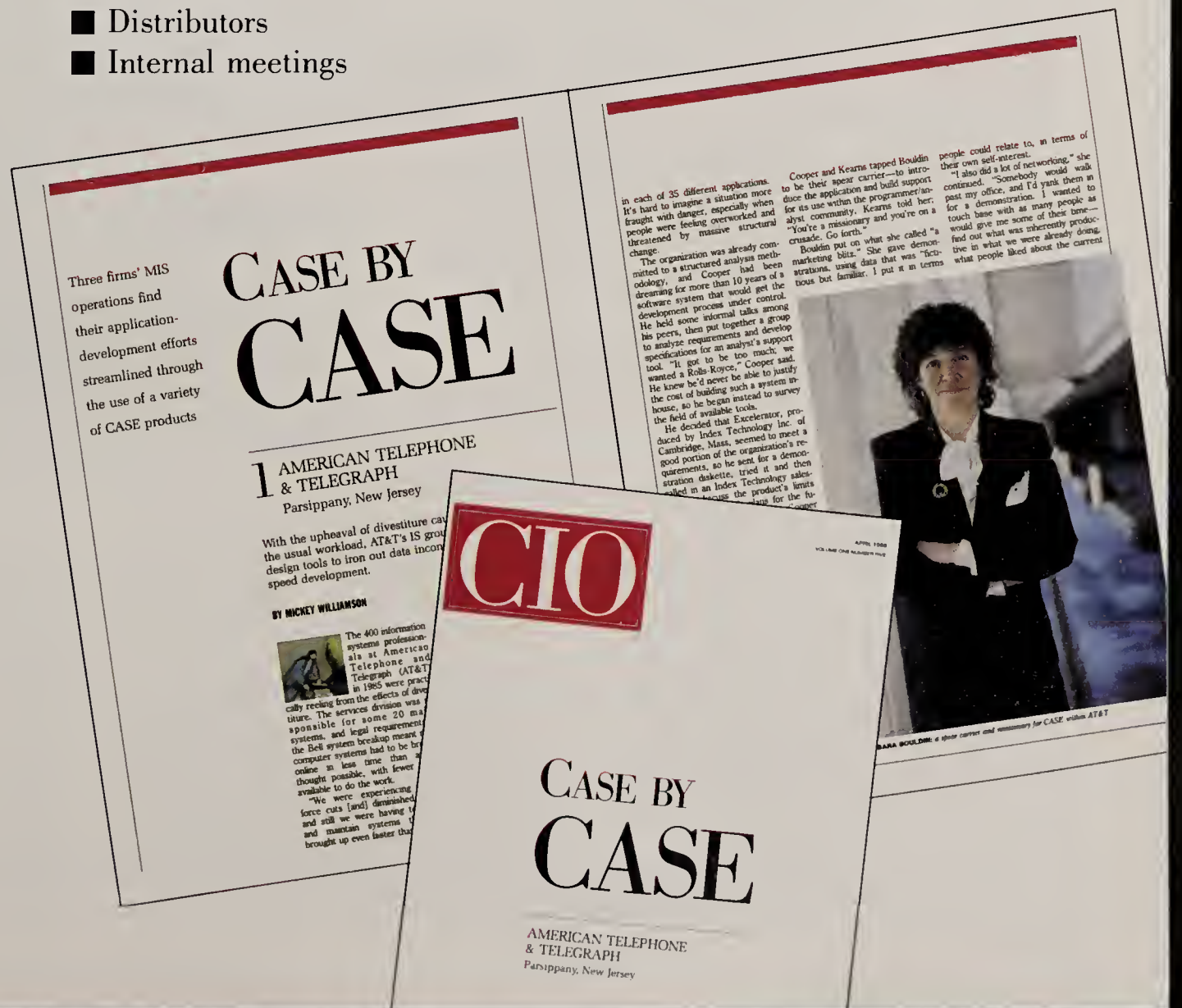
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Categories of Electronic-Mail Users

User Category	Number of Users	Leading Vendors
Mainframe and Mini-based	5.6 Million*	IBM, Digital Equipment Corp., Data General, Hewlett-Packard, Various UNIX-based systems
LAN-based	1.2 Million*	cc:Mail Inc., 3Com, Consumers Software Inc., Enable Software/The Higgins Group, Xerox, Banyan
Public Services	1.8 Million*	Western Union Corp., US Sprint, BT Tymnet, CompuServe, MCI, GE Information Services, AT&T
*These numbers do not represent the users that can be reached via interconnection between and among the three categories of users. For example, public services can reach millions of internal mail users via various gateways.		
SOURCE: Eric Arnum, <i>Electronic Mail & Micro Systems</i>		

move into the era of electronic communications. In the early 1970s, very few businesspeople thought overnight delivery was essential. That quickly changed. In the early 1980s, very few businesspeople thought they needed an upgraded version of the primitive fax technology invented in the mid-1800s to get information across the country. That changed quickly too.

Now, as E-mail proliferates and office workers become accustomed to sending electronic messages including text, data and binary files directly from their desktop computers or terminals, it can reasonably be assumed that fewer secretaries will be waiting in a line down the hall to use the departmental fax machine.

The tremendous growth rate of electronic messaging brings with it

numerous problems for managers charged with the responsibility of making corporatewide systems run smoothly. "Electronic mail can evolve as quickly as we can support the backbone, because the applications are falling into place," said Steve Farowich, project manager/lead analyst for message-handling services at The Boeing Co. in Seattle. "We have an application where user demands are almost outstripping the vendors' capacity to support it."

The movement to the X.400 standard also presents an array of challenges, as does the tendency of far-flung corporate units to sprout diverse messaging systems like wild mushrooms. Despite these challenges, electronic mail is changing the way we communicate—between offices and across continents. ☐

Michael F. Cavanagh is executive director of the Electronic Mail Association.

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703 683-8500

This IS conference offers six tracks: Networking/LANs; Digital Imaging/Optical Disk; Software; Supporting the End-User; Computer Graphics-Presentation; and Computer Graphics-CAD. In addition, there is an exposition featuring new products. Registration fees: \$445 for full conference; \$185 for seminars.

DB/EXPO '90

Moscone Convention Center, San Francisco
March 27-29
Norm De Nardi Enterprises
415 941-8440

"Putting the Technology to Work—Database, Tools and Connectivity," is the theme of this conference. Topics discussed include advanced solutions in distributed databases, development tools, CASE products, AI products, 4GLs and object-oriented systems. Registration fees: \$695 for 3 days; \$375 for one day.

Expert Systems: Integration with Databases and Real-Time Systems

Interactive videoconference
March 28, 12-3 p.m. EST
Institute of Electrical and Electronic Engineers, and The Learning Channel
703 276-0881

This videoconference addresses the problems, techniques and products of integrating expert systems with existing databases and real-time appli-

cations. Case studies of expert system integration in the banking, finance, manufacturing and airlines industries are discussed. Registration fees: \$1,800 for corporations or government agencies; \$850 for universities.

Patricia Seybold's Technology Forum

Boston Marriott, Cambridge, Mass.
April 2-4
Patricia Seybold's Office
Computing Group
617 742-5200

Distributed network computing and object orientation are the subjects of this conference. Topics discussed include: how PC LANs, databases, imaging technology and voice processing systems fit into the DNC/Object environments; roadblocks to implementation and utilization; and profiles of DNC/Object vendors. Registration fees: \$895 for subscribers; \$1,095 for non-subscribers.

Information Management

The Waldorf-Astoria, New York
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I N D E X

Page numbers refer to the first page of the article(s) in which the company is mentioned. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

Company Index

3M.....	32
AT&T.....	74
Aetna Life & Casualty Inc.....	64
Allied Signal Aerospace Co.....	32
American Airlines Inc.....	52
American Home Products.....	12
AMS Inc.....	32
Apple Computer Corp.....	12, 64
Banc One Mortgage Corp.....	32
The Boeing Co.....	74
Borg Warner.....	12
Businessland Inc.....	12
Chase Manhattan Bank.....	74
Citicorp Information Resources.....	32
Codex.....	12
Cognetics Corp.....	64
Compaq Computer Corp.....	12
Continental Airlines Inc.....	32
Continental Insurance Co.....	32
Deere & Co.....	74
Deloitte & Touche.....	32
Dialcom.....	74
Digital Equipment Corp.....	52, 64, 74
Duff & Phelps Inc.....	20
Eastman Kodak Co.....	12, 32, 64
EDS Telecommunications Services.....	12
Exchange National Bank.....	32
FileNet Corp.....	32
First Nationwide Bank.....	32
General DataComm.....	12
General Motors Corp.....	12
Hewlett-Packard Co.....	52
Holiday Corp.....	64
Hughes Aircraft Co.....	74
IBM Corp.....	12, 20, 52, 74
IDS Financial Services.....	64
Ingersoll-Rand.....	12
John Hancock Financial	

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Services.....	32
Lotus Development Corp.....	64
M & SD Network Services Inc.....	12
MassMutual Life Insurance Co.....	64
McDonnell Douglas Corp.....	32
MCI.....	12, 74
Midlantic National Bank.....	12
Merrill Lynch & Co.....	20
Motorists Mutual Insurance Co.....	32
Motorola Inc.....	20
Mrs. Fields Inc.....	52
NEC.....	12
NeXT Inc.....	16
North American Van Lines Inc.....	32
Northern Telecom.....	12
ON Technology Inc.....	64
Otis Elevator Co.....	52
Peat Marwick Main & Co.....	32, 52
Progressive Corp.....	20
Rolm.....	12
Service Federal Credit Union.....	32
SmithKline Beecham Animal Health.....	32
Starbridge Communications.....	12
Time Warner.....	12
Toys "R" Us.....	12
Unisys.....	12
US Sprint.....	12, 74
Waldenbooks.....	12
Wang Laboratories Inc.....	32, 74
Western Union.....	74
Westinghouse Electric Corp.....	12

Advertiser Index

AT&T Technologies.....	50
Amdahl Corp.....	44
Ask Computer Systems Inc.....	17
BellSouth Corp.....	22
Codex Corp.....	4
Comshare Inc.....	C4
Digital Equipment Corp.....	C2, 80
Evolutionary Technology.....	76
Execucom Systems Corp.....	11
FMI.....	60
Gandalf Technologies Inc.....	34
Hewlett-Packard Co.....	40
IBM Corp.....	29, 56
Infomart.....	38
KnowledgeWare Inc.....	27
Minolta Corp.....	7
Northern Telecom Inc.....	2
Northgate Computers.....	47, 62
Sears Communications Co.....	19
SIM.....	78
The Computer Museum.....	69
Westinghouse Electric Corp.....	14

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BUSINESS PHONE

The Society for Information Management
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Attn: Valerie Rohrbough

CONFERENCE CALL

QUESTION: *Is it possible for vendors and clients to form strategic partnerships together? Or does the client end up with too much of the risk?*

In most attempts at vendor/client partnerships, the technology vendor commits products and services while the client commits money and an IS strategy. But a CIO also takes tangible financial and business risks in systems development. Without venturing a commensurate risk, is the vendor a true partner—or just another chance the CIO must take?

Phil McKenzie

Director of Special Projects for Sara Lee Hosiery in Winston-Salem, N.C.

“I think partnership is possible with vendors that develop software projects. With software you are buying the capabilities of the vendor organization. You have someone work with you on what that design might look like. Together, you flesh out the initial design into a detailed design, and then you can go into the final phase of getting the software programmed. The vendor partner does the first part so that he can do the second part, so that he might be able to do the third part. If he takes the initial piece of this and does a good job, then he’s probably going to get the second piece.

“We’ve invited several vendors in and talked about a project we have in mind and asked them to give us a proposal. And they say, ‘Here’s

what we think of it, and what we can do, and what we take this project to be all about.’ And we take the people we think are most on target with what we want to do. It’s very judgmental.

“The risk might not be equal, but the vendors are putting their business on the line and their future recommendations as well. They’ve got to do a good job or they don’t stay in the business.

“You first have to be sure that they understand what you’re embarking on, and that you’re very clear on what’s happening. You can’t expect them to go out and come back six months later with a deliverable. If you have them working with you all along, then there are no surprises. It’s very much like a marriage. All you have to do is work at it and it will be fine.”

Carl Wilson

Vice president of Management Information Systems for Pillsbury Foods in Minneapolis.

“Yes, it can occur, but like any good partnership, there have to be some parameters.

“First of all . . . strategic partnerships imply a long-term commitment.

I believe that the only real strategic partnerships with vendors exist when you have a joint business opportunity and you’re creating a product or service to market to other people. Let’s say a software vendor and a company like Pillsbury develop an order-processing system that really meets a

market niche. I think that is a good basis for a strategic partnership.

“Partnership is a very popular term, and it’s thrown around a lot—primarily by the vendors. And it sounds good. It sounds like, ‘We’re in there with you.’ But you’ve got to remember that the vendor’s job is to sell to the guy that’s buying. I would say that a lot of what we call strategic partnerships with vendors are really tactical partnerships.”

Pat Mullen

Director of Information Systems Marketing for Digital Equipment Corp. in Maynard, Mass.

“Our focus groups last year didn’t like the word ‘partner’ because they didn’t find people who were willing to roll up their sleeves and take a risk.

“I think there are different dimensions of partnerships. There’s the case where, as a vendor, you sit down with company X and they want to build this type of system, and you look at it as a vendor and say, ‘Wow, if we had that running on our platform . . . that

would give us a competitive edge.’ Then we collaboratively put people on it. . . . We get marketing rights, they get royalties, and they get their project built faster.

“Another situation is when a vendor becomes a planning partner—virtually a member of the CIO’s staff—to bring different dimensions of expertise to the table.

“I think it’s just recently you’re starting to see . . . some shared responsibility. I think it’s always going to come back to our risk. We put money, people, hardware into it. If it doesn’t come out, if it fails, we’ve lost. If something goes wrong with the [system], they look at the name on the front of the computer. It doesn’t say the client’s name.

“For a company like DEC, a partnership approach is a way to build a relationship hand in hand with a customer. And if we’ve built a trust relationship, then they’re going to ask us to do more things.”

Readers are invited to suggest Conference Call questions. Contact Staff Writer Meghan O’Leary at 508 935-4733, or by fax at 508 872-0618



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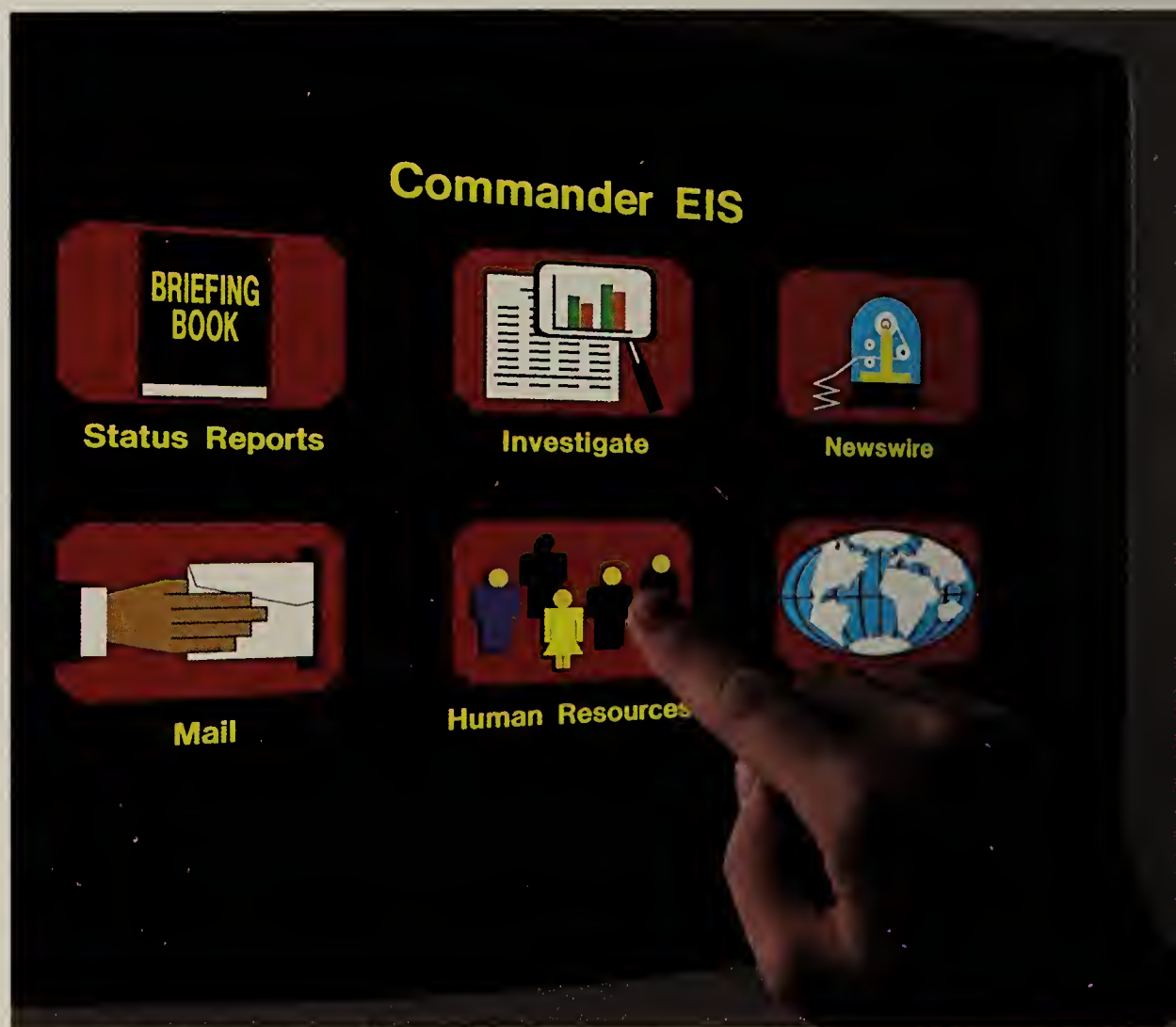


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* International Data Corporation's "Decision Support and Executive Information Systems: Markets and Trends" (Nov. 88).

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